SPECIAL EDITION

Our Biggest Issue *Ever!*

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Vol. 26 / No. 151

Perfect Tenons – 5 easy steps

Router Bits:
- *a new spin on slot cutters*
- *the secret to flat-bottom dadoes*

Table Saw:
4 Space Saving Ideas

classic oak

Tool Cabinet

Woodsmith 25 YEARS

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looking inside

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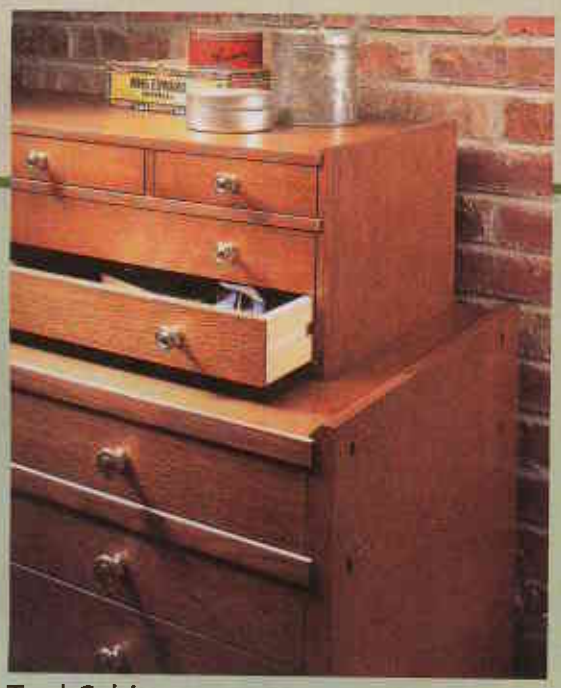

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editor's note

Sawdust

This issue marks the 25th anniversary of *Woodsmith*. And while it's an exciting milestone for the magazine, I think it's important to remember there would be no *Woodsmith* without devoted readers. So it seems appropriate that we give back something to the people that make this magazine possible — all of you.

For starters, you'll be getting more in *Woodsmith* than ever before. We've added 16 pages — that's a 44% increase. But what I'm really excited about is what we're doing with those extra pages. If you take a look at the table of contents at left you can see we've added several new departments and features.

Now in every issue you'll receive more information on tools, jigs & accessories, small shop solutions, and finishing. When you add it all up, we have a total of 8 new departments.

In addition, we've added a couple of exciting new features. The first is Designer's Notebook. Here you can take a look over the shoulder of a project designer and see different ways to modify the design of a project to better fit your needs. Second, if you want to learn the secrets that turn a good project into a great one, be sure to check out our other new feature — Details of Craftsmanship.

Since we were adding pages, it seemed like the perfect opportunity to make some other improvements as well. The goal was to make *Woodsmith* easier to read *and* easier to use. So we have made a number of changes to headlines, typefaces, and page layouts.

All in all, I'm very happy and excited about the changes to *Woodsmith*. I'm sure you will be as well.

Terry

from our readers

Tips & Techniques

Hammered Screw Plugs

Covering screw heads can be a real pain. I usually plug them with a short piece of dowel. The problem is, the dowels are rarely the right wood species or color. While it isn't a big deal for shop or utility projects, on furniture the wrong plugs can stick out. So I came up with a simple way to make my own plugs in just about any size.

In the photo at right, you can see how I do it. The plugs are made from long, square blanks that match the project. They are then hammered through a steel template to the right size. The plugs can then be cut to length and glued in place, as shown in the margin photo at left.

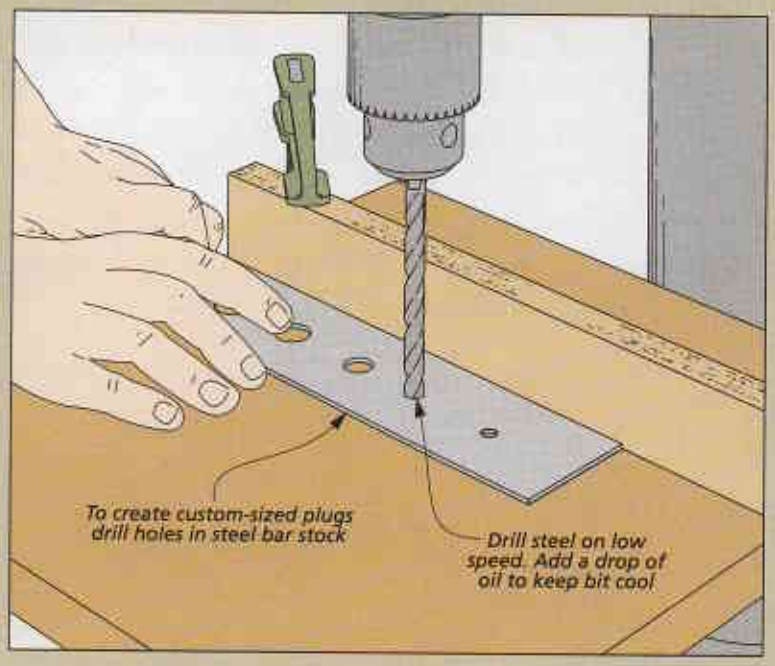
You can make custom screw plugs with a simple steel template.

DOWEL PLUG TEMPLATE. To make your own plugs, start with a piece of 1/8"-thick steel bar stock. I first drilled a series of holes in the steel bar. When drilling, it's a good idea to set up an auxiliary fence on the drill press, as shown in the drawing below. The fence keeps the bar from getting stuck on the bit and spinning it around. I set the drill for a low speed and used a few drops of oil to cool and lubricate the bit while drilling.

Next, I cut some plug blanks from a cut off of the project I'm working on. This way the plugs will match the project exactly. Size the blank to be a little larger than the final diameter of the plug.

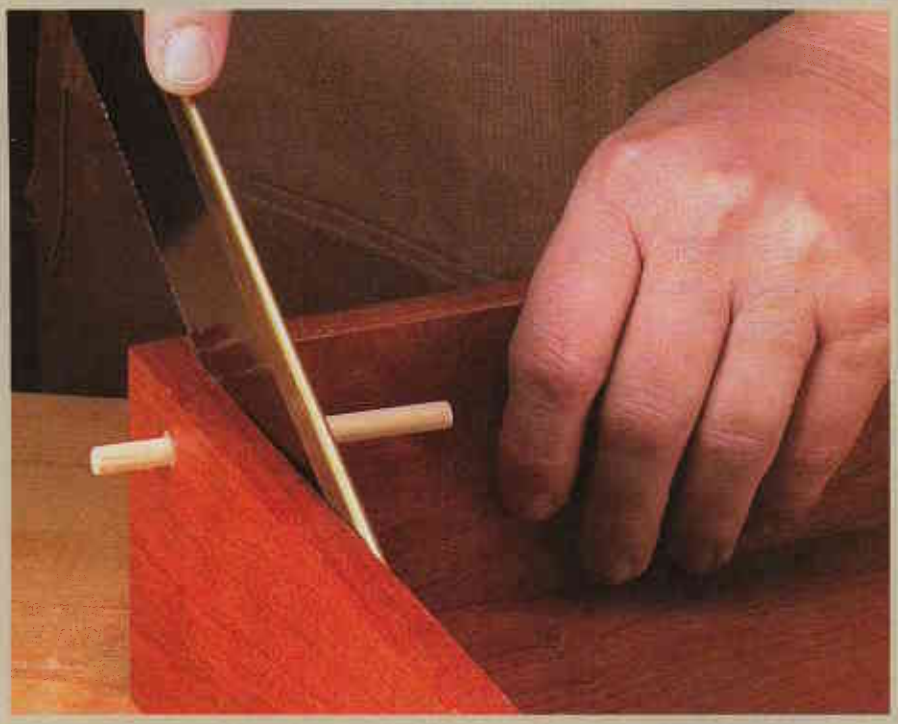
MAKING PLUGS. To make the plugs, set the template over a gap between your workbench and vise or over a dog hole. Then line up the plug blank and hammer it through the hole. I "sharpen" the tip of the blank to help start it, as in the photo above. The force of the hammering and the sharp sides of the template cut the dowel to the right size. If you need another size, just drill another hole.

Frank Crowe
Oshkosh, Wisconsin



Win This Bridge City Block Plane

That's right, send us your shop tips. If your woodworking tip or technique is selected as the featured reader's tip, you'll win a Bridge City Block Plane just like the one shown here. Send your tips and techniques to: *Woodsmith,* Tips and Techniques, 2200 Grand Avenue, Des Moines, Iowa 50312. Or send us an email message at: woodsmith@woodsmith.com.



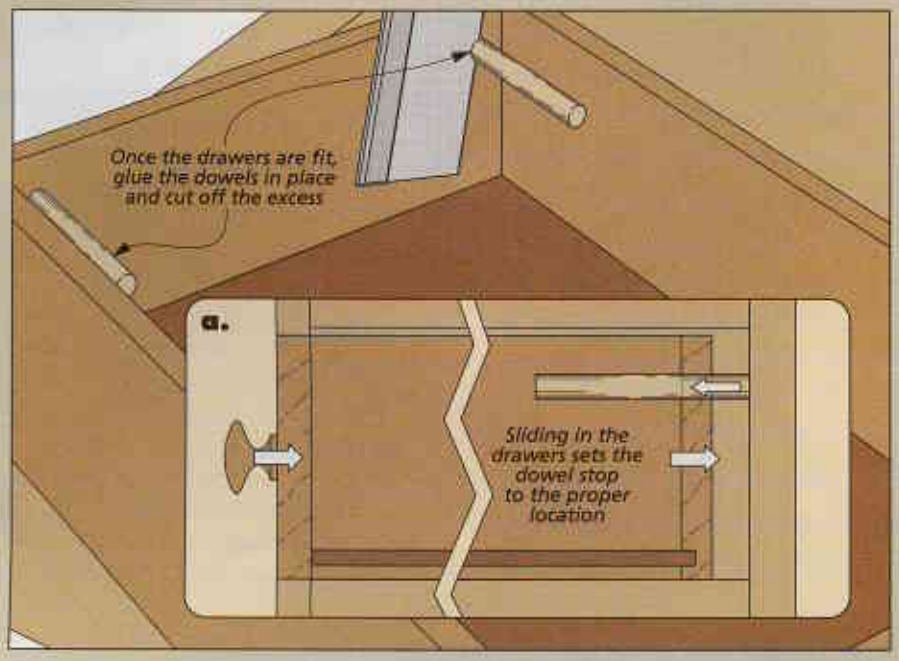
Dowel Drawer Stops

One of the most challenging parts of building drawers is getting them to fit flush at the front. No matter how careful I am in sizing the parts, the drawer is usually a little off. Recently, I've found an almost foolproof way to get drawers to fit perfectly. Best of all, this easy technique doesn't take a lot of time.

The secret is to set the drawer position with dowels. If you take a look at the drawings below, you can see how it works. Start by drilling a pair of ¼"-dia. holes in the back of the drawer. I then slip a piece of dowel in each of the holes. Make sure about 1" to 2" is sticking out the back. Now slowly slide the drawer in place. The dowels will touch the back of the case first and slide forward in the holes. When the drawer is flush, the dowels are set perfectly as stops, as in the detail below.

At this point, you can pull out the drawer, mark the dowel and glue it in place. Once the glue is dry, I cut off the excess with a hand saw, as shown in the photo and drawing below.

Thomas Mannion
Valley Stream, New York



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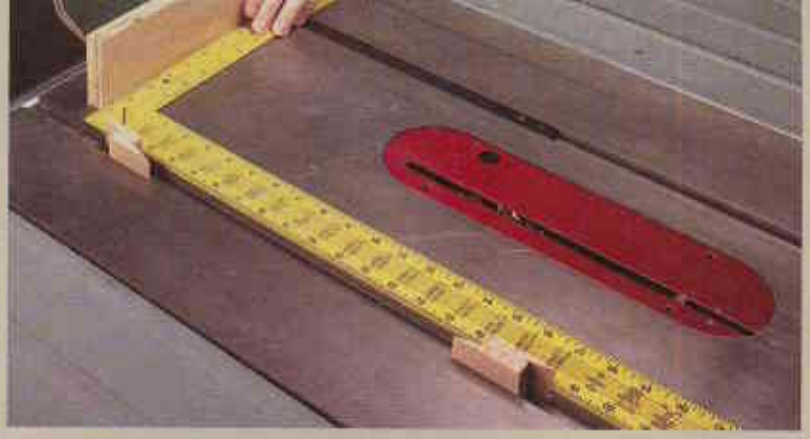


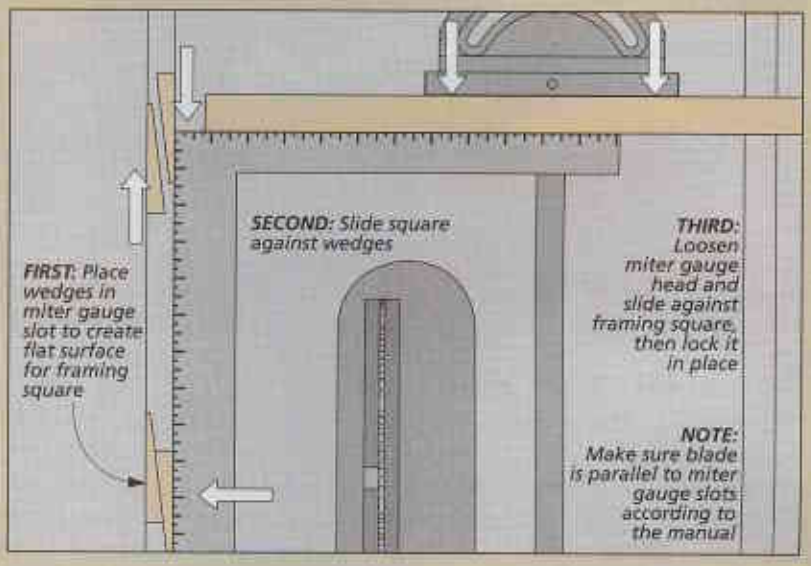
Miter Gauge Squaring

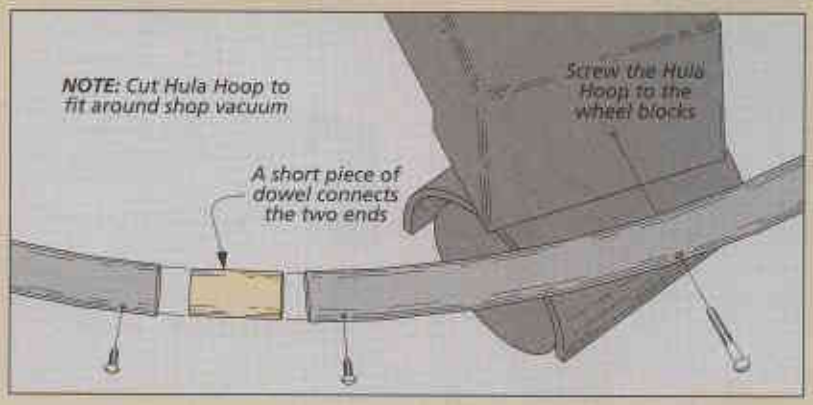
The angle scale on my table saw's miter gauge isn't very accurate. So in order to make a square cross cut, I needed to find a way to quickly square up the miter gauge.

To solve this problem, I grabbed my framing square and a few wedges, as you can see in the photo at right. The four wedges are slipped together on edge in pairs in the opposite miter gauge slot. These two points form a long, flat contact surface for the framing square to rest against, as illustrated in the drawing at right.

Next, I loosened the head of the miter gauge and slid it up to the other leg of the square. Once the head is flat against the square, I know it's square to the blade and I can lock it down and start cutting.

Gilbert Strubel
Hagerstown, Maryland





Shop Vacuum Bumper

Like in many woodworking shops, my shop vacuum sees a lot of action. But in my small shop, the wheel blocks often catch on tool stands and cabinets. To keep this from happening, I made a simple, inexpensive bumper for the vacuum from an old-fashioned toy — a *Hula Hoop*, as shown in the photo at left.

The hoop is screwed to the outside of the wheel blocks to keep them from snagging. To make the bumper, I cut an opening in the hoop and wrapped it around the wheel blocks and trimmed it to length with a utility knife.

I slipped a short piece of dowel in the ends to keep them together and fastened it in place with screws. The hoop can then be screwed to each of the wheel blocks with round head screws, as illustrated in the drawing at left. Just make sure that the screws don't interfere with the wheels.

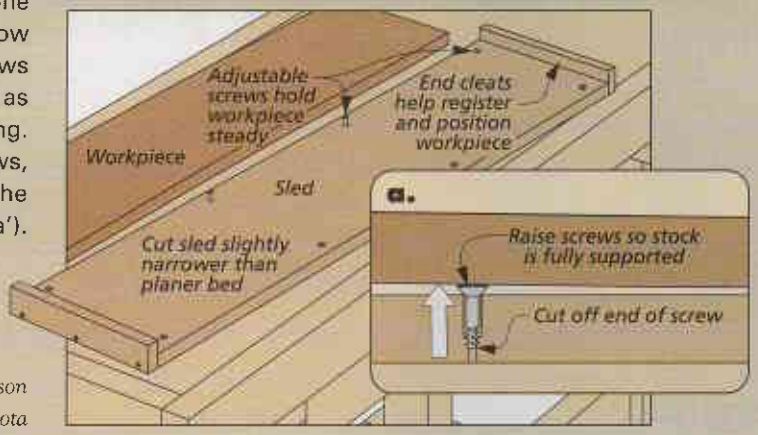
Dan Walters
Bremerton, Washington

Planer Sled

Planing a flat face on a wide, warped board can be a real challenge. The problem is that the uneven surface of the board causes it to rock back and forth on the planer bed like a see-saw. To solve this problem, I built a planer sled.

A pair of cleats on the end register the workpiece. Then to get one face flat, I added a row of cut-off woodscrews along each side, as shown in the drawing. By raising the screws, you can support the workpiece (detail 'a'). When the top face is flat, remove the sled, flip the board over and finish planing.

Brent Robinson
St. Paul, Minnesota



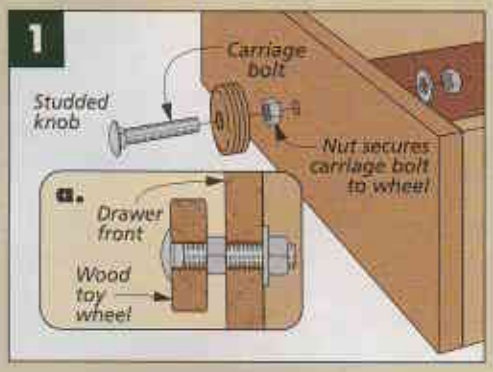
Quick Shop-Made Knobs

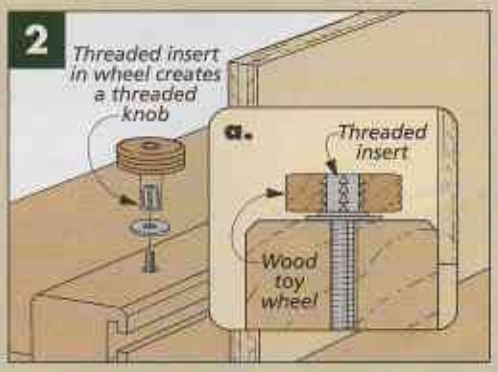
For shop jigs and furniture, I've come up with two knob designs that are cheap and easy to make. Both knobs start with a wood toy wheel.

The first is a studded knob (Fig. 1). It's made with a carriage bolt and a nut to hold it in place.

The other shop-made knob is made by simply installing a threaded insert in the wheel to make a threaded through knob, as shown in Fig. 2.

Marvin Robinson
Arlington, Texas





SUBMIT YOUR TIPS

If you have an original shop tip, we would like to hear from you and consider publishing your tip in one or more of our publications. Just write down your tip and mail it to: *Woodsmith,* Tips and Techniques, 2200 Grand Avenue, Des Moines, Iowa 50312. Please include your name, address, and daytime phone number in case we have any questions. If you would like, FAX it to us at 515-282-6741 or send us an email message at: woodsmith@woodsmith.com. We will pay up to $200 if we publish your tip.

Quick Tips

SPRAY ADHESIVE HOLD-DOWN

A lot of times when cutting with my compound miter saw, the workpiece tends to slip during the cut, ruining the accuracy. In order to keep the piece from slipping, I spray the saw table and fence lightly with a spray-on adhesive. Once it's dry, it makes the saw table sticky enough to hold the piece in place but it won't leave a residue on the workpiece when you're done.

Matthew Michaels
Cordova, Tennessee

APRON POCKET MAGNET

I keep a short, steel ruler in a pocket in my shop apron. It comes in handy for all sorts of jobs. The problem is, when I lean over, the ruler sometimes falls out. To keep it in place, I sewed a small magnet to the inside of the apron. Now with the magnet, the ruler stays put.

Bryan Hopfensperger
Culbertson, Nebraska

DUCT TAPE SANDPAPER BACKER

It's easy for the sandpaper on my sanding block to get snagged and torn on a workpiece. Besides being a pain, it's a waste of materials. But I've come up with a simple way to make it last a little longer. I apply a layer of duct tape to the back for added reinforcement.

Bill Reiman
Brooklyn, New York

RUBBER HOSE BLOWER

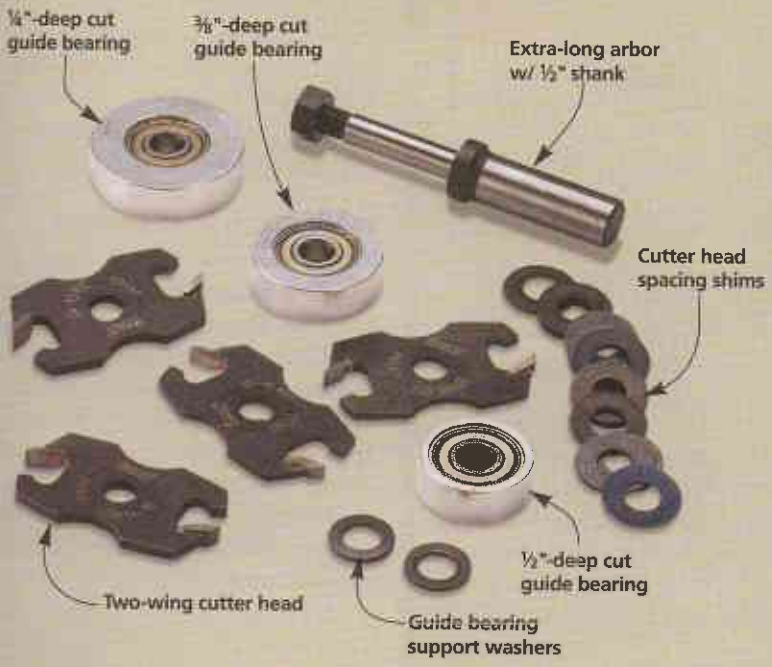
Blowing the dust out of a corner or gap in a project can send the dust back up into my face or under my safety glasses and into my eyes. To get around this problem, I now use a short length of rubber hose to reach into tight spaces. You can find it at a hardware store or home center. I cut the tubing long enough to keep my face out of the way of the blowing dust.

Yaniv Matza
Tamarac, Florida

tools of the trade

a new spin on Slot Cutters

You might want to take a look at a new, stackable slot-cutting set. It will do everything your old bits did and a whole lot more.



When it comes to routing a slot in the edge of a workpiece to hold a spline or a panel, a slot cutting router bit can't be beat. I have a collection of them in my router bit drawer that I put to use on a pretty regular basis.

So how do you make this handy tool even better? Well, you make it more versatile. And that's what you'll get with one of the new, stackable slot-cutting sets on the market.

Recently I had a chance to try out one of these new sets and I was pretty impressed. The set in the photo at left is made by *Freud* and comes with an extra-long arbor, four wing cutters (1/8", 3/32", 3/16", 1/4"), three different sized bearings and an assortment of washers and shims.

These sets work similar to a stack dado set for your table saw. You can use any of the wing cutters separately but you can also stack them together on the long arbor to make wider or custom-sized cuts. The shims provided can be placed between the cutters to fine tune the width of the cut. The set shown here (and most other sets) will make cuts from 1/8" to 23/32" wide in 1/32" or finer increments.

The fact that these sets will accommodate different sized bearings adds another level of versatility. (Some sets come with extra bearings, but with others you purchase them separately.) This is a really helpful feature when you want to change the depth of cut.

NEW USES

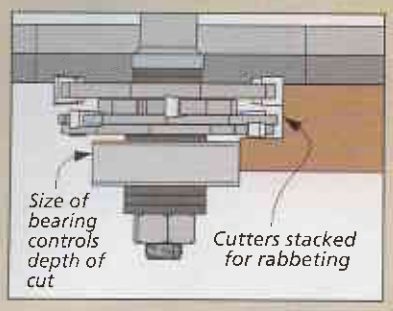
Aside from minimizing the clutter in your bit drawer, these stackable sets have other advantages over your standard slot cutters.

WIDE RANGE. An obvious plus is a much greater range of the width of cut. My widest standard slot cutter will cut a 1/4" groove. Anything wider requires more than one pass. With a stacked setup, this isn't a problem. Accurately-sized wide grooves for splines (photo at left), plywood panels or joinery can be cut in a single pass. And with a wide, stacked setup your slot cutter becomes an efficient rabbeting bit (left drawing below).

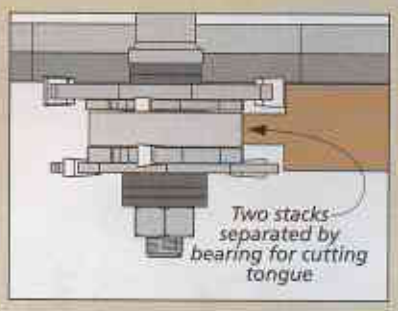
JOINERY. A stackable set also offers some interesting new joinery options. Two stacks of cutters separated by a bearing, as shown in the middle drawing below, will quickly cut an accurate tongue on the edge of a board. Then use a single cutter to cut a matching groove and you'll have a tight-fitting tongue and groove joint. Use a smaller bearing and you can cut simple stub tenon and groove joinery for doors or face frames.

Most of these sets also include a cutter sized to cut a slot for #0 plate joiner biscuits (right drawing). If you don't own a plate joiner, this makes a great substitute.

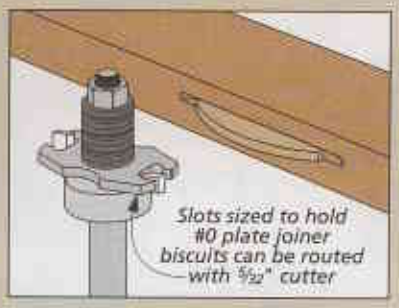
A stackable set won't do it all, but it does more than enough to make a new user out of me. W



Rabbeting. *With a stack of cutters and the proper sized bearing, you have an accurate rabbeting bit.*



Cut a Tongue. *Routing the tongue of a tongue and groove joint can be an easy, one-step operation.*



Router Biscuit Joinery. *The 5/32" cutter included in this set turns your router into a biscuit joiner.*

Worth A Look: E-Z Dial Slot Cutter

If you're looking for a versatile slot cutter that offers extreme accuracy and a whole lot of convenience, the *Amana E-Z Dial* might be for you. This new, adjustable bit is basically a whole slot-cutting set in an easy-to-use, one-piece assembly.

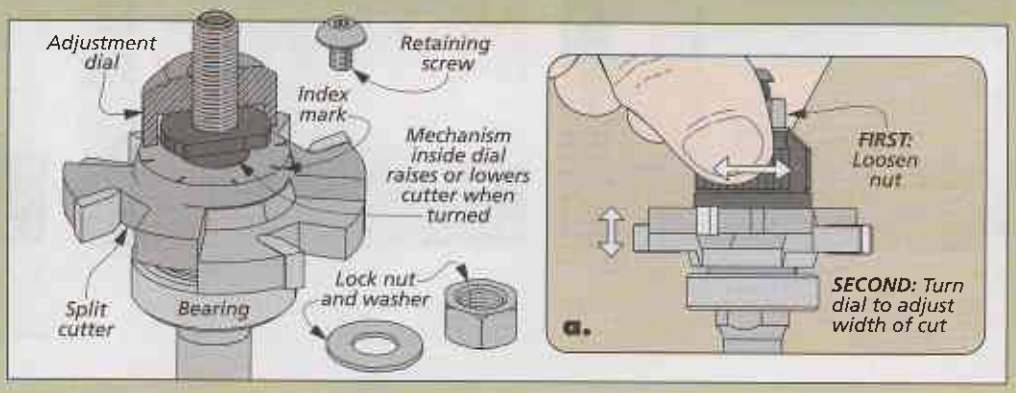
It features a split, four-wing cutter (actually two separate, two-wing cutters) mounted on the arbor. You can adjust the width of your cut by loosening the lock nut at the top with the wrench provided and then simply turning the adjustment dial (detail 'a'). One of the cutters then moves up or down along the shaft to create a wider or narrower cutting surface (drawing at right). A fixed bearing below the cutters allows cuts up to 1/2" deep (drawings at right).

The mechanism allows for very fine adjustments without any guesswork. Each revolution of the dial equals 1/32" change in width. And additional index marks allow adjustments as fine as 1/256".

The *E-Z Dial* comes in two widths. The smaller size will cut slots from 1/8" to 1/4" wide while the larger (photo at right) cuts from 1/4" to 1/2" wide. Both will cut up to the same depth. So if you pick the *E-Z Dial* over a stack-type set, you're going to lose some range.

The *E-Z Dial* doesn't come cheap. It's list price is $150, but you can usually find it substantially discounted. So if you like the idea of being able to easily and accurately "zero in" on the width of your cut, you might give this bit a try.

The *Amana E-Z Dial* manages to combine convenience and versatility.



all about

getting a Flat-Bottom Dado

The best way to get a flat-bottom dado on a table saw is to use a router.

When it comes to cutting dadoes, I usually turn to the table saw. The main reason is I can cut full-depth dadoes quickly. The table saw is also pretty easy to setup — it's just a matter of setting the rip fence or adjusting the miter gauge.

THE PROBLEM. That doesn't mean the table saw is perfect. Take a look at the photos below and you can see what I mean. Inexpensive adjustable or "wobble" dado sets will leave a rounded bottom, as shown in the left photo.

While the quality of cut is better with more expensive "stacked" dadoes, the bottom can still be uneven and the blades often leave score marks on the bottom of the dado, as in the middle photo. This isn't a big deal if the ends of the joint will be covered. But when it's exposed, you want it to be perfectly flat and smooth.

THE SOLUTION. So how do you do it? I've found the best solution to be a combination of a hand-held router

▲ **Bad.** A wobble dado set leaves a concave surface which can create large, unsightly gaps. Not only is this ugly, but the joint is not as strong.

▲ **Better.** With stacked dado sets, the outside blades can leave score marks on the sides of the dado. While this doesn't weaken the joint, it's still noticeable.

▲ **Best.** To get the tightest, best-looking dado joint, use a dado clean-out bit in a hand-held router. The top-bearing bit is guided by the sides of the dado.

and a table saw, as you can see in the top photo on the opposite page. The secret behind this technique is an inexpensive router bit.

The bits are called dado clean-out bits. And as the name implies, they have one purpose and one purpose only — to cut perfectly clean and flat dadoes. To do that, the bottom of each bit has two cutting flutes that are ground dead flat. But what makes them different is that the carbide-tipped flutes are short (only 3/16"), as shown in the photo at right. Making the cutter length so short reduces the vibration, giving you a cleaner cut.

CHOOSING THE RIGHT BIT. The bits come in three cutting diameters (1/2", 5/8", 3/4") to fit a variety of dado sizes. To find out where to get the bits, turn to "Sources" on page 51. I like to use a bit that's a little narrower than the dado. This way, I can rout up and down both sides cleaning up the bottom of the dado. Trying to use a bit the same size as the dado could cause it to bind.

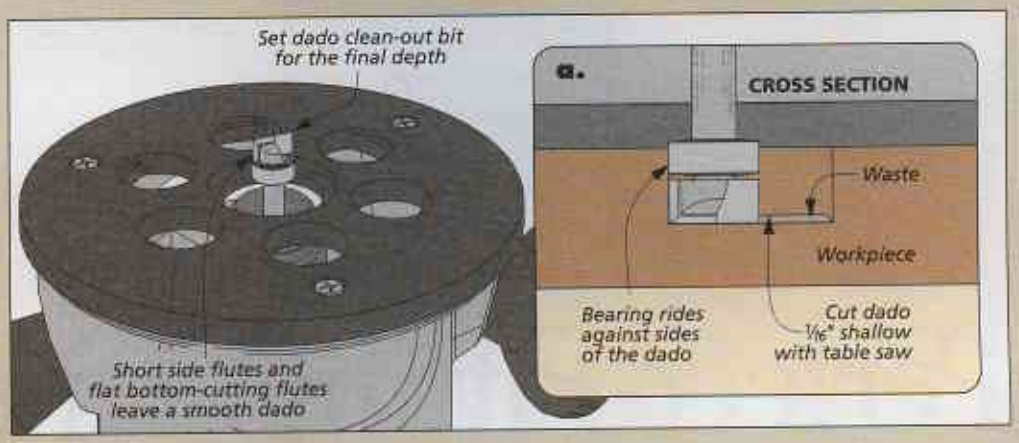
What makes this technique so easy is that the sides of the dado cut on the table saw act as a template for the guide bearing. Here's how it works: Because of the short cutting length, you only need a shallow dado for the bearing to ride on. The great thing about this is that I don't have to make any jigs and there's very little setup.

TRIMMING A DADO. Cutting a dado this way takes advantage of the strengths of both the table saw and the router. To cut a flat-bottom dado, start by using the table saw with a dado set to quickly remove most of the waste. It will also cut flat, smooth sides that will guide the router bit. The only thing you'll do differently is to cut the dado slightly shallower than final depth of the dado (about 1/16").

The flat-bottom dado clean-out bits come in several sizes to match the width of the dado.

Next, install the router bit and set it for the final depth of the dado, as shown in the drawing below. Then set the router on the workpiece and turn it on. Bring the bit into the dado with the bearing riding on the edge of the dado, as illustrated in detail 'a.' Make a pass up one side and back down the other. That's all there is to it. W

ONLINE EXTRA
video workshop



Shop Tool: Dado-Cutting Bit

The dado bit is guided by a top-mounted bearing and has a longer cutting length than the clean-out bit.

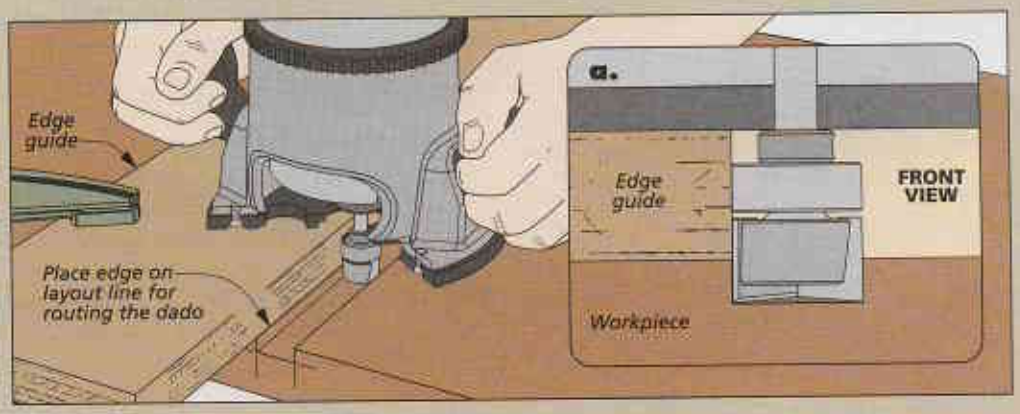
After using the dado clean-out bits shown above, I came across a similar bit that can be used to rout the entire dado. As you can see in the photo at right, this dado-cutting bit doesn't look all that different from the dado clean-out bits.

But there's an important difference to notice. The side cutting flutes are longer, which lets you take a bigger bite while routing dadoes. Yet it's still much shorter than straight bits to reduce vibration, resulting in a cleaner cut.

TAKING OUT THE GUESSWORK. One of the challenges of using an ordinary straight bit to rout dadoes is calculating the offset from the edge guide to the layout line. But with the top-mounted bearing on the dado bits, the edge guide can be placed right on the layout line, as illustrated in the drawing below.

Like the clean-out bit, you can get the bits in several cutting diameters (1/2", 5/8", 3/4", 1"), so you can match the bit to your dado size.

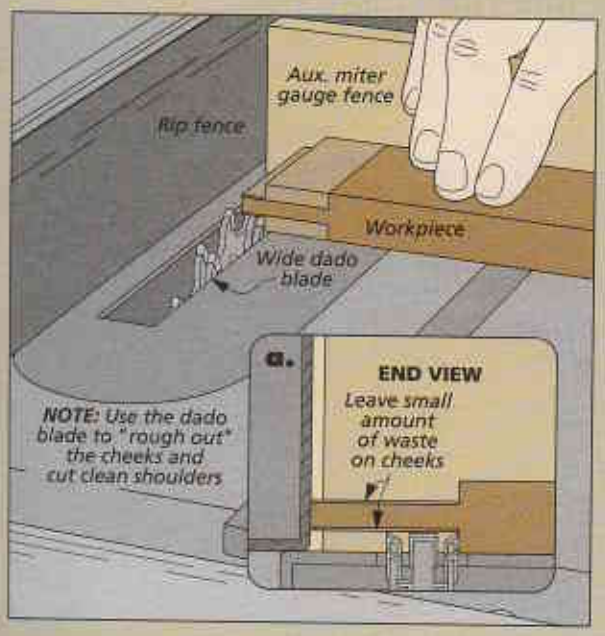
CUTTING A DADO. To rout a dado, set the depth just slightly less than the full cutting depth of the bit and take the first pass, as illustrated in detail 'a.' If your dado needs to be deeper, you can lower the bit and make another pass.



techniques from our shop

5 steps for Perfect-Fitting Tenons

Learn to fit your tenons like the pros. We'll let you in on our simple, shop-proven technique.



1 Cheeks & Shoulders

For me, a perfect-fitting tenon starts with a dado blade on the table saw. Here you're going to establish the long shoulders and waste away most of the material on the cheeks.

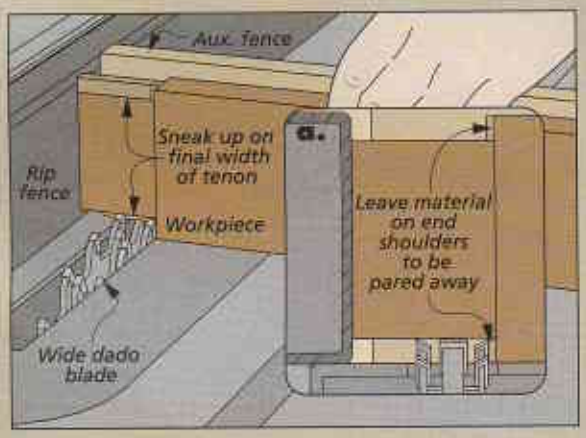
As shown in the drawing at left, a miter gauge with an auxiliary fence backs up the workpiece and the rip fence is used as a stop to define the final length of the tenon.

With the blade set slightly low, make your first cuts at the end of the tenon. Check the rough thickness and then work back toward the shoulder. The final pass along the shoulder should be very light. At this point, the tenon will be cut to length, but still just a hair thick.

In the first step, the cheeks of the tenon are roughed to a thickness that just begins to fit the mortise.

2 The End Shoulders

Step two starts at the table saw and ends with a little hand work. Here is where you'll cut the tenon to final width and establish the two end shoulders. The drawing below shows how to proceed.



Use the same rip fence setup you used to cut the cheeks of the tenon. Begin by setting the dado blade slightly low so you can sneak up on the width of the tenon. Now with the workpiece on edge, start to waste away the material at both ends of the tenon. Check the progress as you go, gradually raising the blade.

But don't cut right up to the shoulders of the tenon. It's too likely that the blade will leave score marks or possibly chip the long shoulders. As illustrated in detail 'a,' you want to leave a little material here to be carefully pared away later.

Once the width of the tenon is perfect, the work at the table saw is complete. The photo at right shows where to go from here. With the workpiece firmly clamped in the workbench vise you can pick up a sharp chisel to complete the work on the end shoulders. Several shallow slicing cuts will remove the remaining material easily and leave a clean, square shoulder.

▲ A sharp chisel will make a quick job of squaring the end shoulders. Shallow paring cuts will leave them clean.

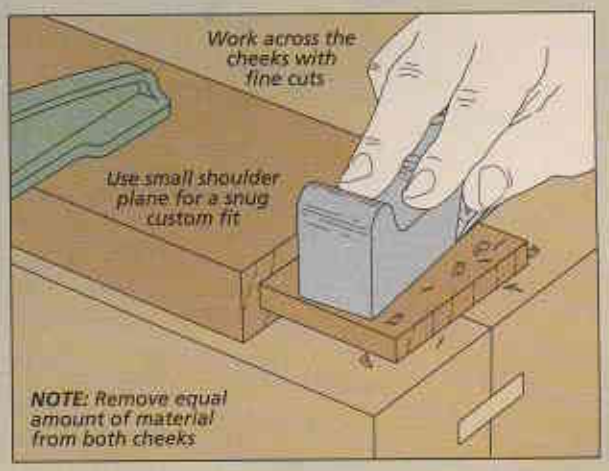
3 A Custom Fit

At this point the shoulders are cut around all four sides. The width is perfect but it's still a little "fat" through the thickness. So now it's time for a custom fit. You're going to carefully trim the cheeks of the tenon for a snug fit in its mortise. And for this job, my tool of choice is a small shoulder plane.

A shoulder plane gives you the handy combination of a fine cut with great control. You can work across the cheeks of the tenon without fear of tearout (right drawing). So maintaining a flat surface is easy.

I start at the end of the tenon and then work back with light cuts. You want to remove the same amount of material from both sides of the tenon, so take a couple of passes on one side and then switch faces.

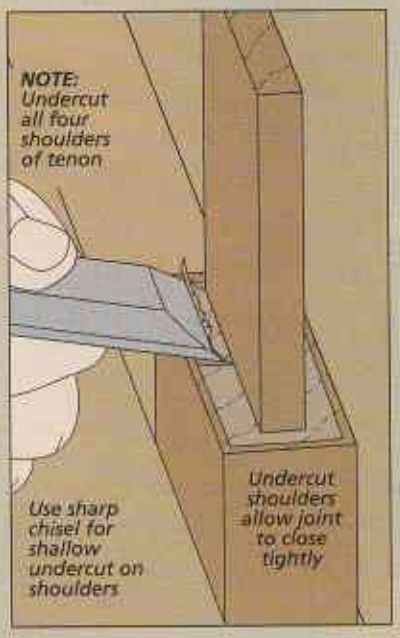
With just a little work, the tenon will begin to slide deeper into the mortise. If it takes more than firm pressure to seat the tenon, trim some more and test it again.



4 Undercut

Now your tenon is a perfect match with its mortise. But you also want the joint to look as good on the outside as it fits on the inside. So the next step involves a little fine tuning on the shoulders of the tenon.

You can quickly get the idea from the drawing at right. I use a sharp chisel to slightly undercut the shoulders of the tenon around all four sides. Start about $^1/_{16}$" back from the face of the workpiece and use the same type of shallow paring cuts you used for the short shoulders of the tenon. You don't need to cut deeply. The small amount of relief you create will ensure that the joint closes tightly and looks seamless.



5 A Quick Chamfer

Now you have a mortise and tenon joint with a perfect look and fit. But one more simple step will make certain that this is still the case after the glue and the clamps are applied. The photo below gives you the idea. A small chamfer planed onto the ends of the tenons will allow it to slide smoothly into the mortise during assembly and provide a bit of relief space for glue. W

jigs & fixtures

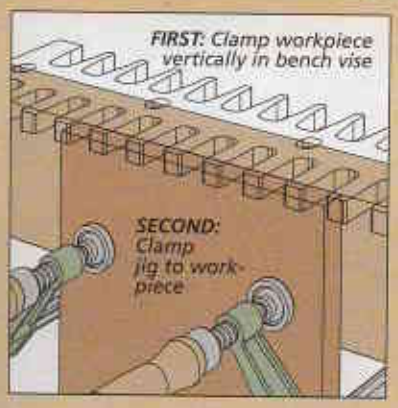
using the Keller Jig

Whether it's on a small box or a large case piece, no woodworking joint is quite as strong or impressive as a through dovetail. Really the only drawback to this classic joint is that it can be a lot of work to cut and fit accurately. That is, until you try out the *Keller Dovetail Jig*.

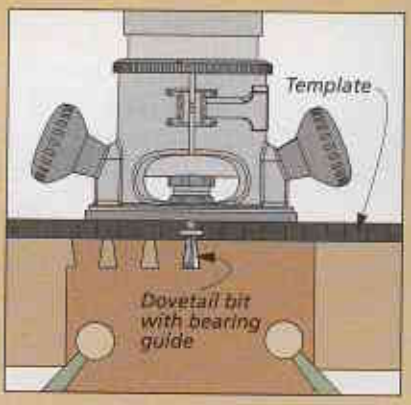
I've found that with this easy-to-use jig you can rout flawless through dovetails in a matter of minutes. With it, an entire project can be completed before you'll even have most other jigs set up.

WHAT'S IN THE BOX. Some dovetail jigs have a learning curve so steep, you'll almost be discouraged from using them. Not so with the *Keller Jig*. Mine is the 1500 model and when you open the box, all you'll find is a thick, phenolic template, two router bits with bearing guides (one dovetail and one straight), and the instructions for using the jig.

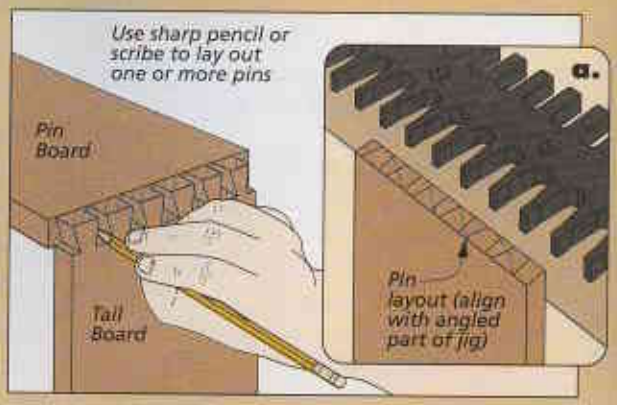
How-To: Routing the Tails



Position the Template. *The first step is to position the dovetail template so the workpiece is centered equally between two outside slots.*



Set the Depth. *You want the height of the bit to equal the thickness of the pin workpiece plus 1/2" for the template and 1/32" for clean-up.*



Mark the Pins. *Once the dovetails are routed, they are used to mark the position of the pins. The precisely-machined pin template should then line up perfectly with your layout (see detail).*

The comb-like template has back-to-back routing slots. You use the straight slots to cut the tails and the flared slots to cut the pins. Since there are no adjustments to make, the setup is quick and easy. All you need to do is mount the template on a clamping block.

VERSATILE. The *Keller* system allows you to use either a hand-held router (photo at left) or a router table setup (photo at lower right). The router table method can be especially helpful for thin or narrow stock, where the workpiece won't support the weight of the template, block, and router.

GETTING STARTED. Routing the dovetails couldn't be easier. For a quick overview of the steps involved see "How-To" on the previous page.

Start by clamping the workpiece securely in a bench vise. Then place the straight slots of the template over the end of the workpiece so the workpiece edges are evenly spaced between two slots. Clamp the jig in place (Fig. 1) and that's all there is to it. Note: Always rout from behind the template, pulling the router into the workpiece.

ROUTING THE TAILS. With the dovetail bit in the router and set to the proper height, you're ready to make the first cuts. And unlike many dovetail jigs that require a guide bushing, *Keller* provides a dovetail bit with a bearing that is sized to precisely fit the slot milled in the template. The bearing enters the template effortlessly, with little or no play. The whole operation from clamping to cutting only takes a few minutes.

MARK THE PINS. Once all the tails are complete, setting up to rout the pins is a snap. If you've ever cut a dovetail by hand the next part will be familiar. That's because you use the tails you've just cut to lay out the pins on the end of the mating piece. A sharp pencil, scribe, or bench knife will do the job.

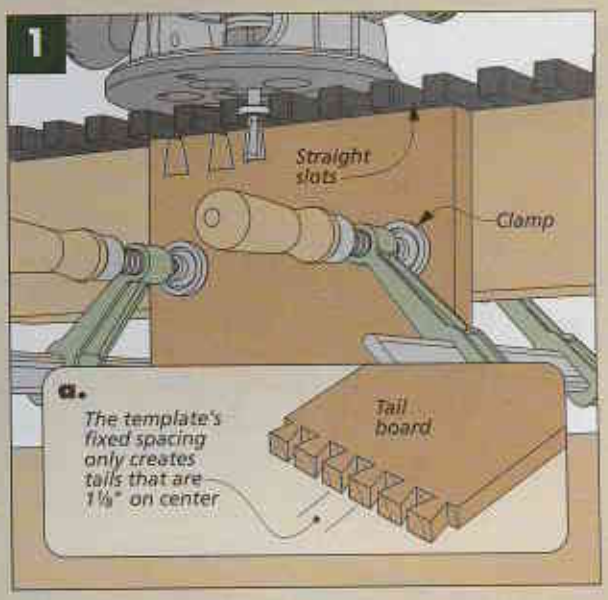
ROUT THE PINS. When you place the flared slot side of the template over the end of the pin workpiece, it should line up perfectly with your marks. Just take the time to get a good "match" before you clamp the template in place.

Next, you'll use the bearing-guided straight bit, set to the same depth as the dovetail bit, to rout the pins. Note: To save time and ensure accuracy, I like to use two routers — one for each bit setup.

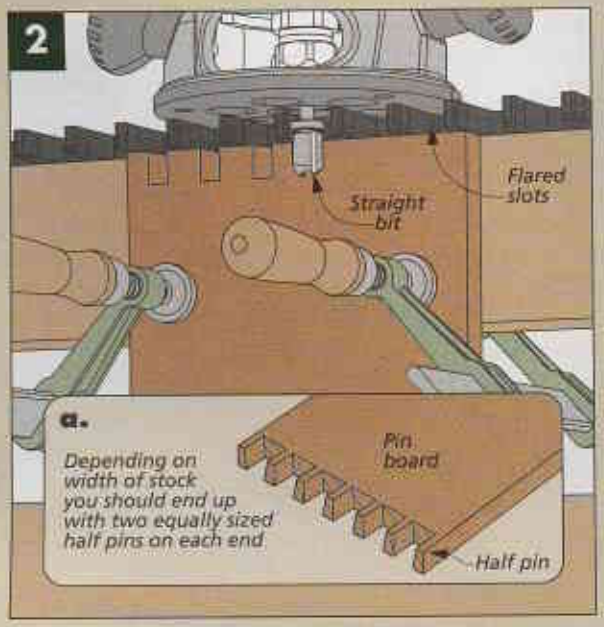
The pin cut takes two passes to cover the full width of the flared template slots. But that's it.

THE FIT. With just a little bit of firm pressure the two halves of the joint will slide together like a hand in a glove. The joint is as tight as any I've seen and the whole process takes a fraction of the time. It made a true believer out of me. W

The fit of the completed dovetails is about as good as you'll find. And from beginning to end, routing dovetails in 1/8" to 3/4"-thick stock only takes minutes.

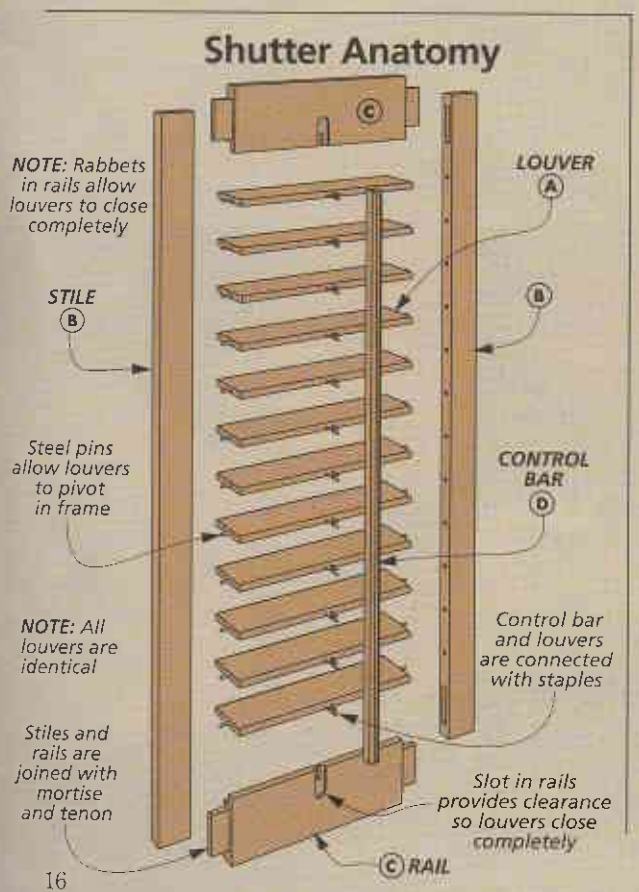


The Keller Jig works just as well on a router table. An auxiliary small bit set can be used with the same template for small boxes that use thinner stock.



woodworking technique

shop-made Louvered Shutters



Want to try your hand at making louvered shutters? Two simple jigs will make it easy.

Building movable louvered shutters is a project I've wanted to tackle for quite a while. It would not only involve some new and interesting woodworking challenges, but the end result would be something really functional. And for me it was a great learning experience. I found that there's more to building louvered shutters than I had imagined.

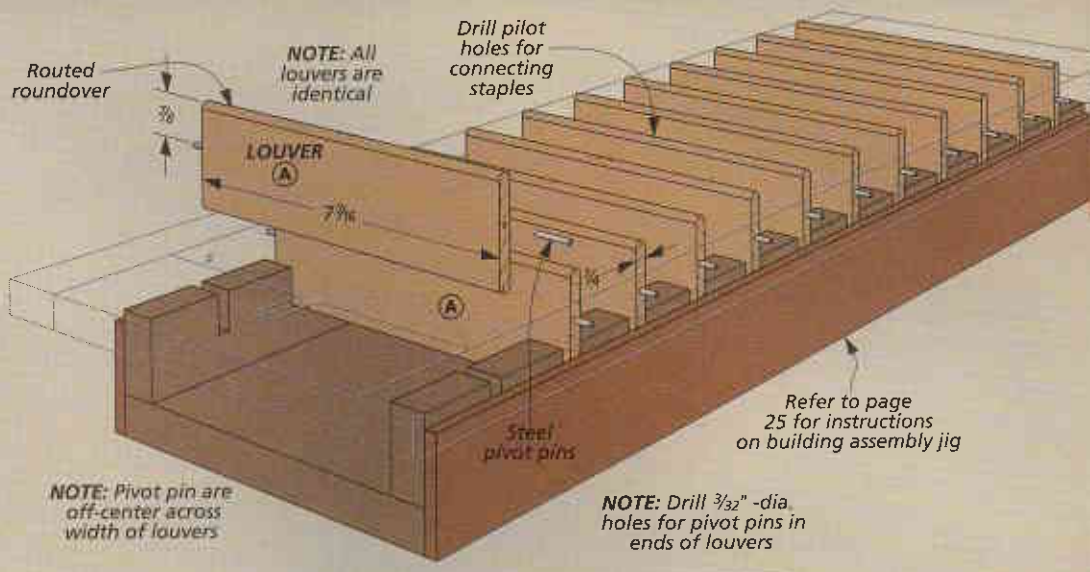
ALL THE PARTS. The construction of movable louvered shutters is pretty standard. The "anatomy" drawing at left tells the story. The heart of the shutters is the louvers. On my shutters these are just 2"-wide slats of wood — rounded along the edges. Metal pins inserted in the ends of the louvers allow them to pivot easily in the simple mortise and tenon frame. The louvers are spaced so that in the closed position they overlap like a row of fallen dominoes.

But now how do you get the louvers to move together? Well, this is simple, but rather clever. As you can see, a control bar is loosely fastened to the louvers with staples. When the control bar is moved, all of the louvers follow along.

Another trick that I came across was how to keep the weight of the control bar from making the shutters "self-closing." The pivot pins in the ends of the louvers are positioned $^1/_8$" off-center across the width of the louver. This is enough to counter-balance the control bar.

Now this might sound like a lot of work, but that's not the case. With the help of a couple simple jigs and a little patience, you'll have working shutters in no time.

making the LOUVERS



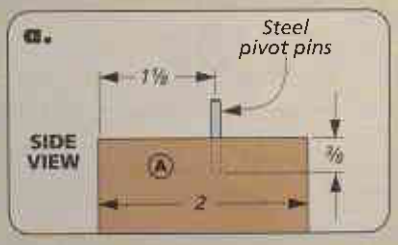
When building louvered shutters, there are two important things to keep in mind. First, you want all the louvers to be consistent and fit properly in the frame. And second, once all the pieces are made, you need an easy way to assemble them. This is where the two simple jigs I built come into play. So before you get started, you'll want to turn to page 25 and put these jigs together. It'll be time well spent.

MAKING THE LOUVERS. I built this project from the inside out and started by making the 12 identical louvers. The How-To box below shows you all the basics, so I'll just touch on the high points.

First, I picked out some straight-grained 3/4"-thick stock and took it to the table saw. For these shutters, you'll rip it into oversized blanks and then resaw the blanks into two halves. After planing these strips to final thickness (1/4"), I cut the 12 *louvers (A)* to width and length.

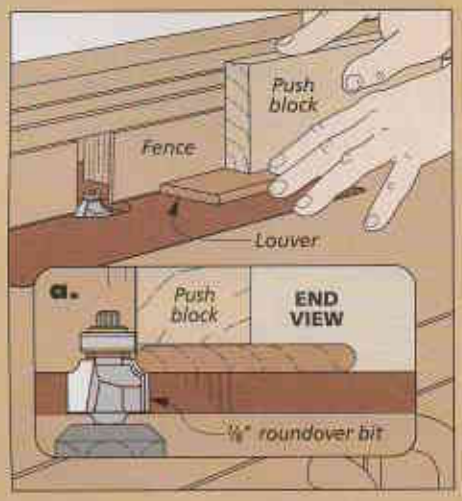
ROUNDOVER. The thin louvers will look nicer with rounded edges. A roundover bit in the router table will make quick work of this detail.

HOLES AND MORE HOLES. After routing the roundovers, you have pieces that look like completed louvers. But to make them "operational" you need to drill two sets of holes in each louver. The off-center 3/32" holes in each end of the louvers will hold the steel pivot pins (detail 'a'). And a pair of pilot holes in one edge of each louver will make installing the connecting staples go a lot easier. These next two steps are where the simple drilling jig really pays for itself.

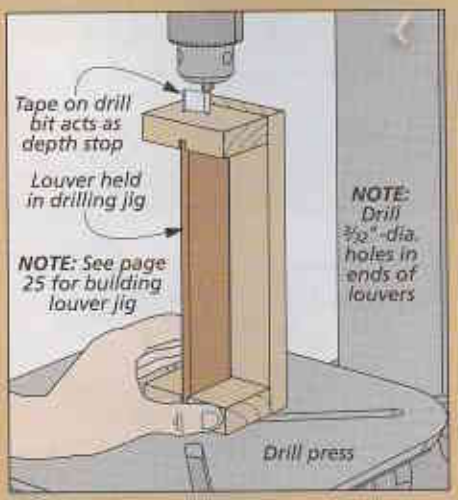


Once the holes were drilled, I placed the louvers into the assembly jig and then carefully tapped the steel pivot pins into place as shown in the drawing above.

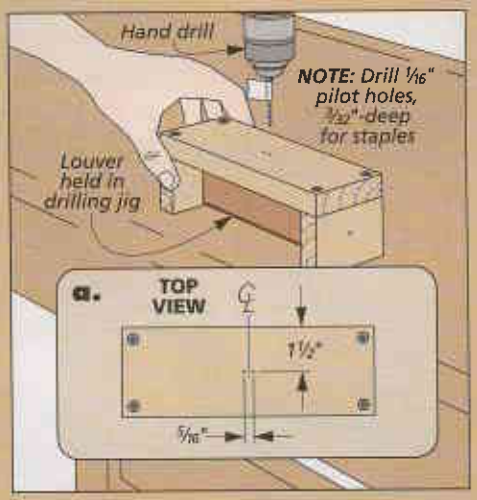
How-To: Louver Basics



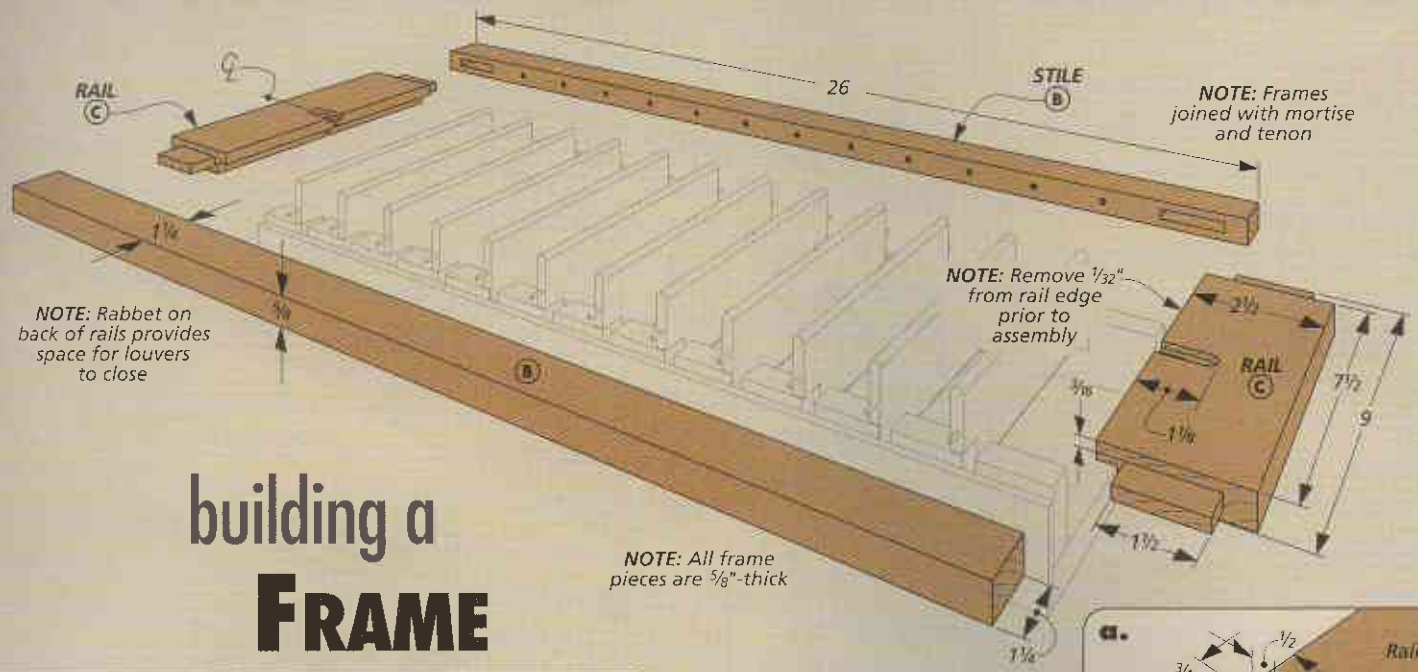
Shape the Edges. *Once the louvers are cut to size, you can take them to the router table. A 1/8" roundover bit will put the traditional rounded edge on the louvers.*



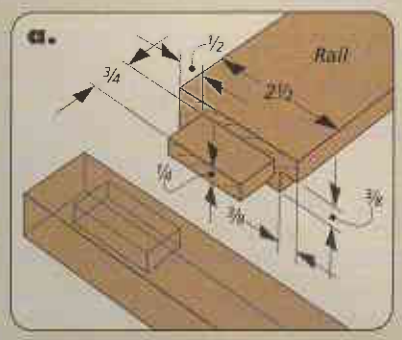
Pivot Pin Holes. *Next, one by one the shaped louvers can be inserted into the drilling jig. First, at the drill press, you can drill the pivot pin holes in the ends.*



Staple Pilot Holes. *After drilling the holes for the pivot pins, I laid the jig and louver on the workbench and picked up a hand drill with a 1/16" bit to complete the job.*



building a FRAME



At this point the louvers are resting in the assembly jig and just need a frame to hold them. A strong but lightweight mortise and tenon frame is what I chose (drawing above).

THE JOINERY. The construction of the frame is pretty straightforward. I began by cutting the *stiles (B)* and the *rails (C)* to size from 5/8"-thick stock. Then I laid out the mortises on the stiles and drilled them out. I completed the mortises at the bench by squaring up the sides and ends wth a sharp chisel.

Cutting the tenons on the ends of the rails was a job for the dado blade on the table saw. The article on page 12 will give you a detailed look at this process.

"LOUVER FRIENDLY." After all of the tenons are cut and fitted, the joinery is complete. But the frame is not quite ready for assembly. A little more work is needed to make it "louver friendly."

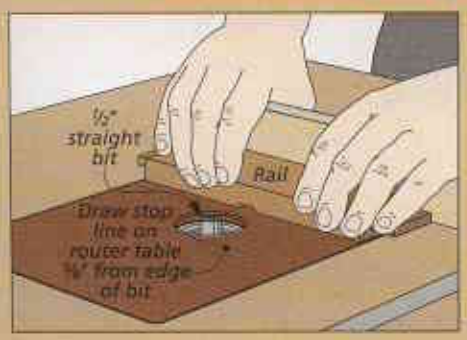
When the louvers are in the closed position, you want them to lay tightly against one another. To allow this to happen, the top and bottom rails need a couple simple modifications. The box below shows how to do this.

First, I routed a short, shallow slot into the front of both the top and bottom rail. This slot forms a pocket for the control bar to slide into when the louvers are in the closed-up or closed-down position. And a saw kerf cut through the center of the slot provides clearance for the connecting staples on the back of the control bar.

Finally, cut a rabbet in the back of each rail to allow the louvers to close into the frame and then trim 1/32" off the rail for clearance.

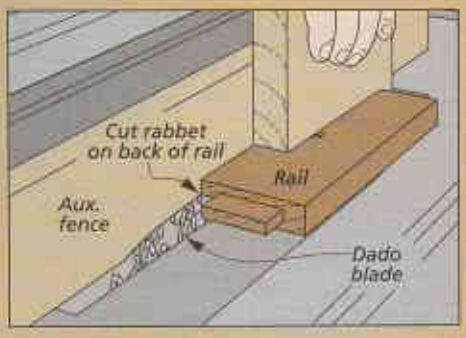
PIVOT PIN HOLES. After the pivot pin holes are drilled in the stiles, the frame will be ready to accept the louvers. You want to do this as accurately as possible so that the louvers will be evenly spaced and won't bind in the frame. Just follow the process shown in the box on the opposite page.

How-To: Modifying the Rails



Control Bar Slots. *A sharp, 1/2" straight bit in the router table makes cutting a clean stopped slot in the rails an easy job.*

A Saw Kerf. *Now, at the table saw, make a centered 1/2"-deep cut through the slot to provide clearance for the staple.*



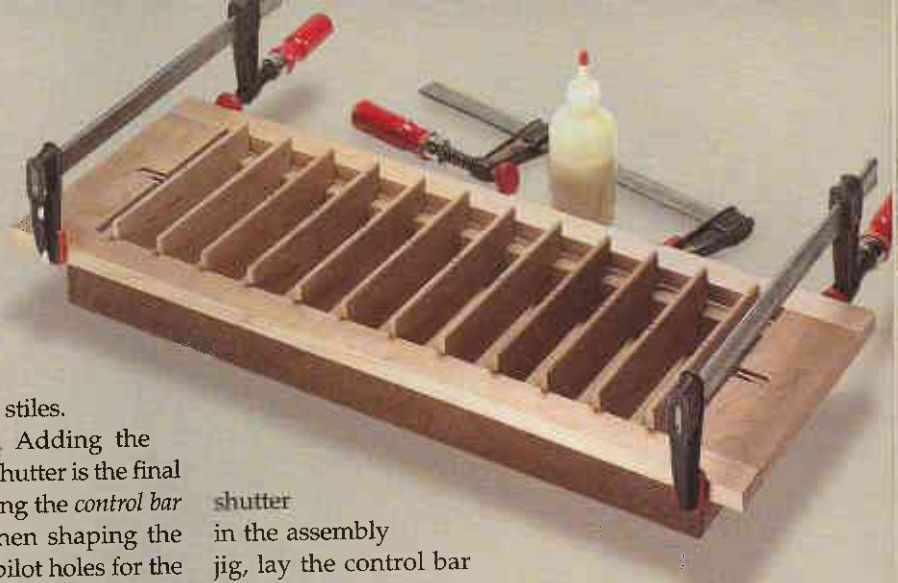
A Simple Rabbet. *Finally, the dado blade will quickly cut a rabbet in the back of each rail that allows the louvers to lay flat.*

FINISH. Now before you begin the assembly, you might consider a short detour. I realized that once the shutter was assembled, it would be a real pain to apply the stain and finish and do a decent job of it. So it's best to hold off on the assembly until after you do at least some of the finishing on the louvers and the frame. (You can dry clamp the frame to do the finish sanding.) This interrupts the flow of the project a bit, but it will sure ly save on some time and frustration in the long run.

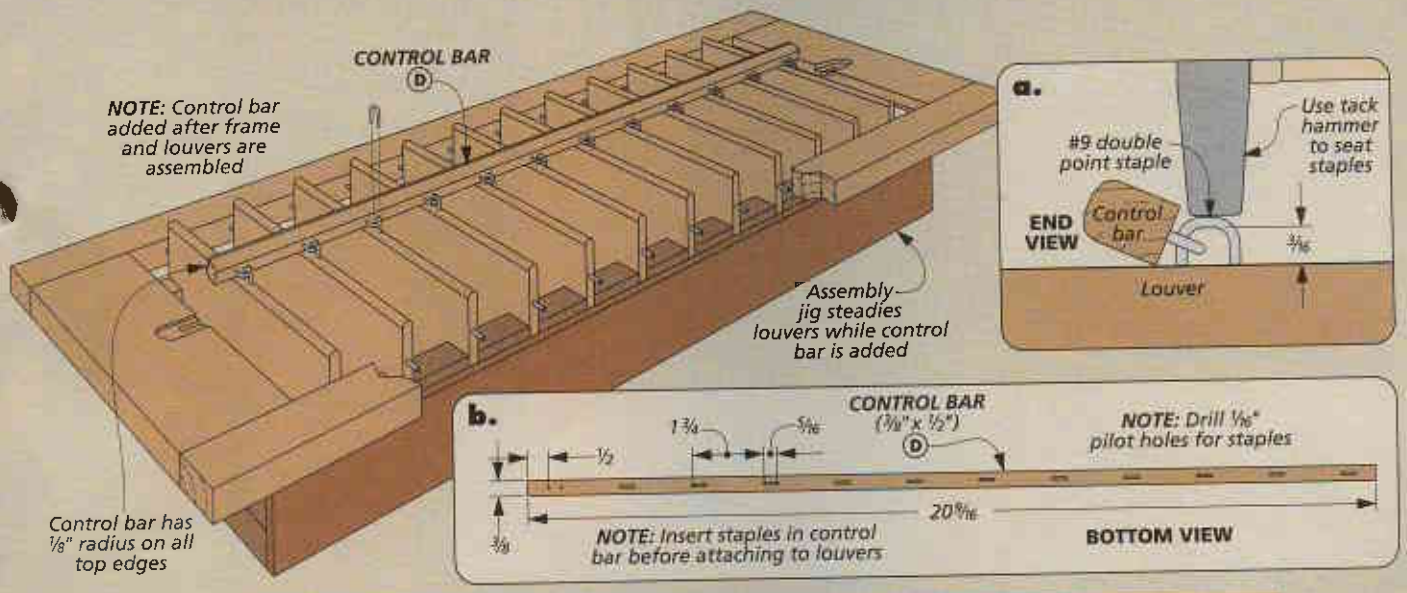
THE ASSEMBLY. At this point you can begin the assembly. With the louvers set in the assembly jig, just carefully fit one stile over the pivot pins. Add glue to the joints and then assemble the rails and the second stile. One clamp at each end will pull the joints tight. A temporary clamp through the middle will help push the pivot pins into the stiles.

THE CONTROL BAR. Adding the control bar to the shutter is the final step. Start by cutting the *control bar (D)* to size and then shaping the edges. Now drill pilot holes for the staples (detail 'b'), to match the louver spacing. Here again, it's best to prefinish the control bar.

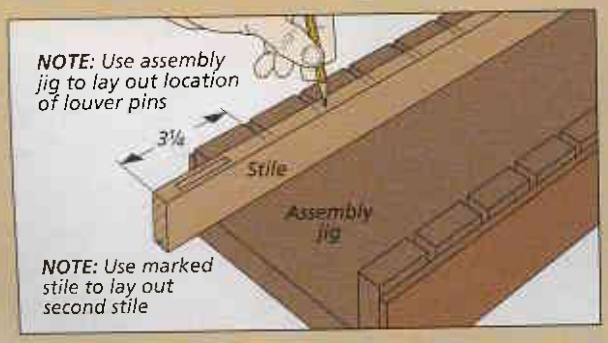
To continue, I picked up a tack hammer and a pair of needle nose pliers and carefully inserted staples into the control bar. With the shutter in the assembly jig, lay the control bar on the louvers and get it properly lined up. Then loop a loose staple through the staple in the control bar and gently tap it into the pilot holes (detail 'a'). When all the staples are inserted, you can lift the shutter out and give it a try. W



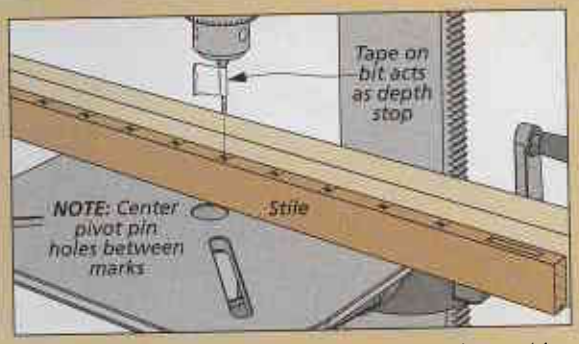
Using the handy assembly jig, you can easily turn the loose parts into an attractive, functional shutter.



How-To: Adding the Pivot Pin Holes



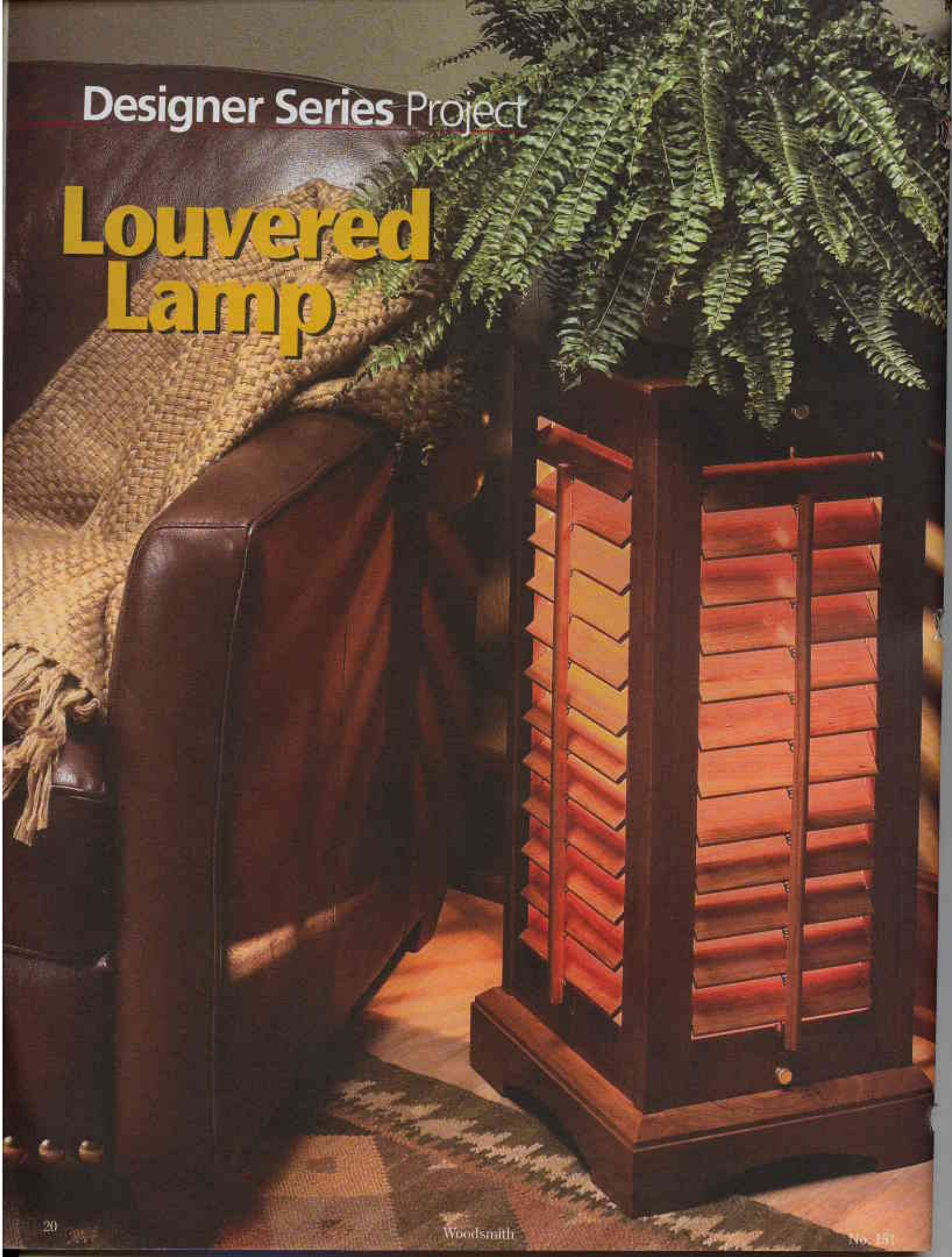
Layout. *Accurate layout of the pivot pin holes is important. Transfer the louver spacing from the assembly jig to the stiles and then center the holes between the marks.*



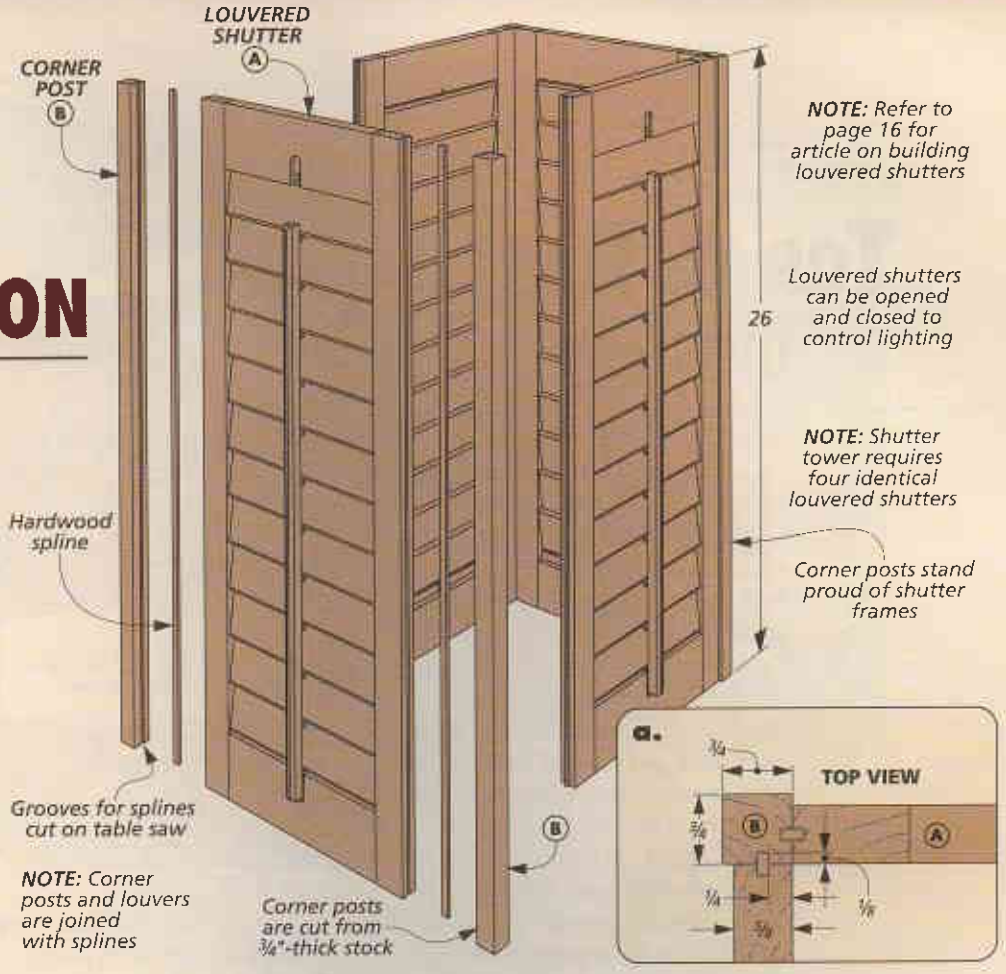
Drilling the Holes. *Once you've marked the position of the holes, a fence clamped to the drill press table will allow you to drill them accurately.*

Designer Series Project

Louvered Lamp



shutter tower
CONSTRUCTION



Normally, a louvered shutter is used to keep the bright light out of a room. But the louvered shutters of this cleverly designed lamp are meant to let the light into the room.

This attractive cherry lamp looks and functions like no other lamp. The louvered shutters allow complete control of both the intensity of the light and its direction. You can easily create any mood that suits you — from soft light to bright, direct light or reflected.

I think you'll agree, it's a pretty unique project and when put to use, it's sure to draw attention.

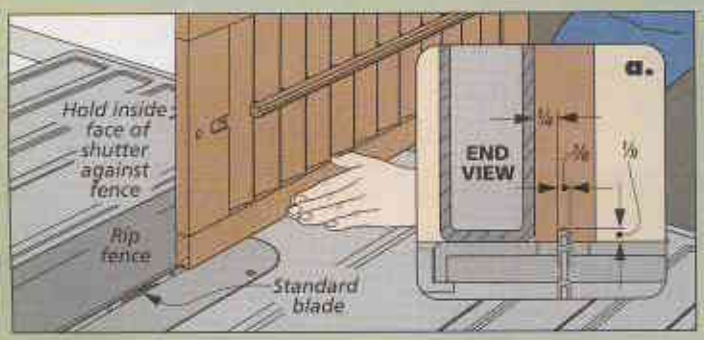
SHUTTERS AND POSTS. I began by making four louvered *shutters (A)* like the ones shown above. The article on page 16 will take you through the process. Now if you take a look at the drawing at right, you'll see that the shutters are joined to square corner posts with splines to form the lamp tower.

So with the four shutters standing by, I cut the four *corner posts (B)* to size from ¾"-thick stock. Next the ⅛"-deep grooves that will hold the splines can be cut in the shutter stiles and the corner posts. The boxes below will give you some help. The ¾"-square corner posts stand proud of the shutter stiles (detail 'a'). So when cutting the grooves, hold the back of the shutter stiles and the inside faces of the corner posts against the fence.

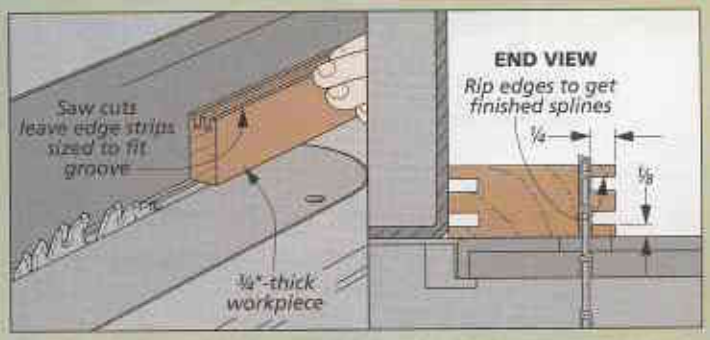
SPLINES. Once all the grooves are cut, you'll need to make 8 hardwood splines sized to fit them. This is just a two-step process, as shown in the right-hand drawing below.

ASSEMBLE THE TOWER. With the splines keeping all the pieces aligned, the assembly goes pretty smoothly. I didn't try to glue up all four sides at once. Start by gluing and clamping all four of the corner posts onto two of the shutters. Then glue the two remaining shutters in between to complete the tower. Check the tower for square and make sure everything is flush at the top and bottom.

How To: Grooves and Splines

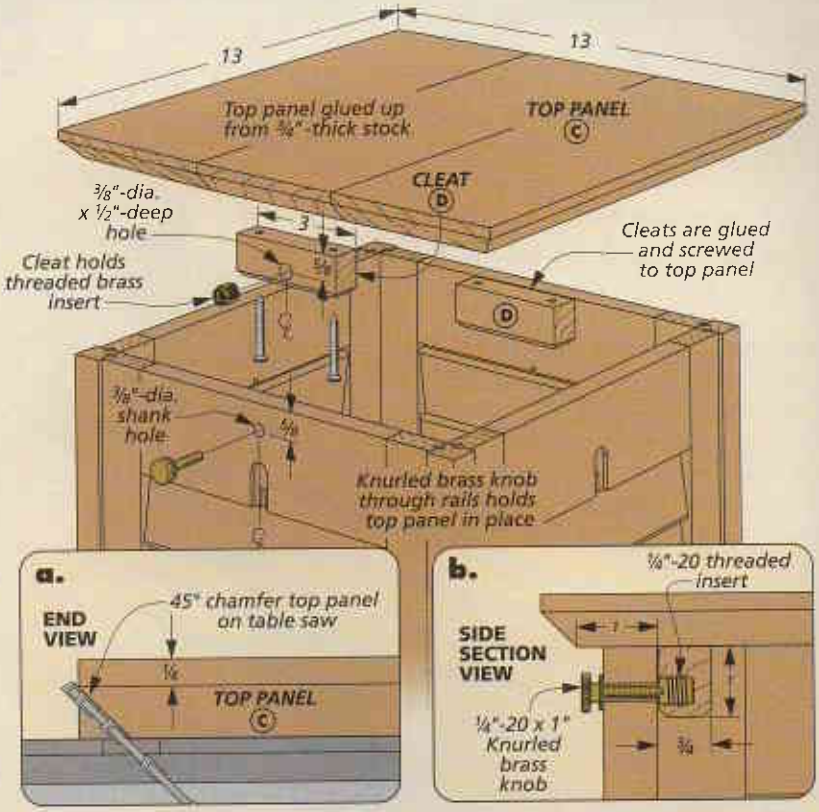


Cutting the Grooves. *The grooves that hold the splines are simply cut in a single pass across the table saw. Just take care to hold the inside face of each piece against the fence.*



Cutting Splines. *Making small splines to fit the grooves is a two-step process. Start with saw cuts in the edge of a workpiece. Ripping off these edges will leave you with properly sized splines.*

Top & Base assembly



Once the shutter tower is assembled, you can begin work on enclosing it with a top and a base. Then it's just a matter of adding the lights.

THE TOP. Take a look at the drawing at right and you'll see how the top is assembled. First, I glued up the *top panel (C)* from ¾" stock and then cut it to size. Next a wide chamfer is cut around the bottom edge to create a transition between the top and the tower (detail 'a').

EASY ACCESS. I wanted the top panel to be fastened solidly to the tower, but also easily removable for access to the wiring inside. The exploded drawing above and detail 'b' show how to resolve this problem. First I added two chamfered *cleats (D)* that hold threaded inserts to the underside of the top. Knurled brass knobs installed through the top rails of the shutters will hold the top firmly in place.

BUILD A BASE. With the top completed, the simple base is next. It serves to give the lamp a steady footing and also provides a good place to hide some of the wiring components you'll add later.

BOTTOM PANEL. The lower drawing at left shows the details of the base. You can begin by making a *bottom panel (E)* identical to the top panel. As you see, it's also fastened to the tower for easy removal (detail 'b').

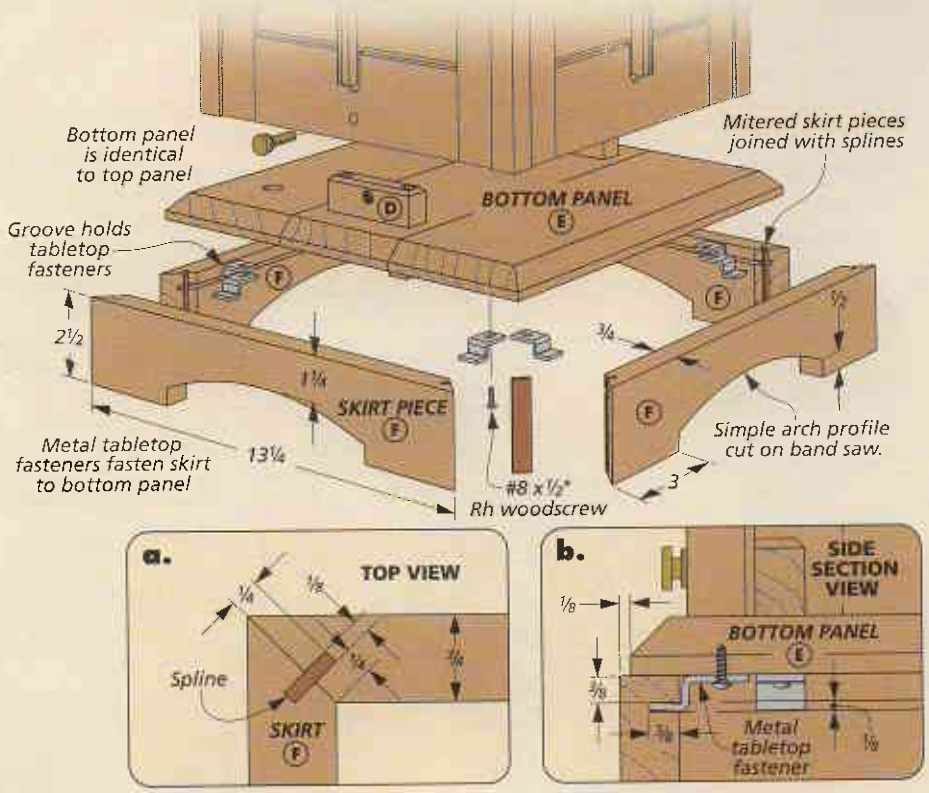
THE SKIRT. The final task is assembling the mitered skirt that the bottom panel rests on. You can begin by cutting the four *skirt pieces (F)* to width and rough length from ¾" stock. Then miter the ends to form a square frame sized to sit proud of the bottom panel (detail 'b').

Next, while the blade of the saw was still at 45°, I cut spline grooves in the mitered faces (detail 'a'). The splines will reinforce the joints and make the the assembly go easier.

Before leaving the saw, I cut grooves to hold tabletop fasteners (detail 'b'). These hold the bottom panel to the skirt tightly while allowing it to expand and contract.

With the joinery completed, I moved from the table saw to the band saw. Here I cut the arch profile into the skirt pieces.

GLUEUP. Now the skirt can be glued up and fastened to the bottom panel. And after adding base assembly to the tower, the lamp is ready for some light.



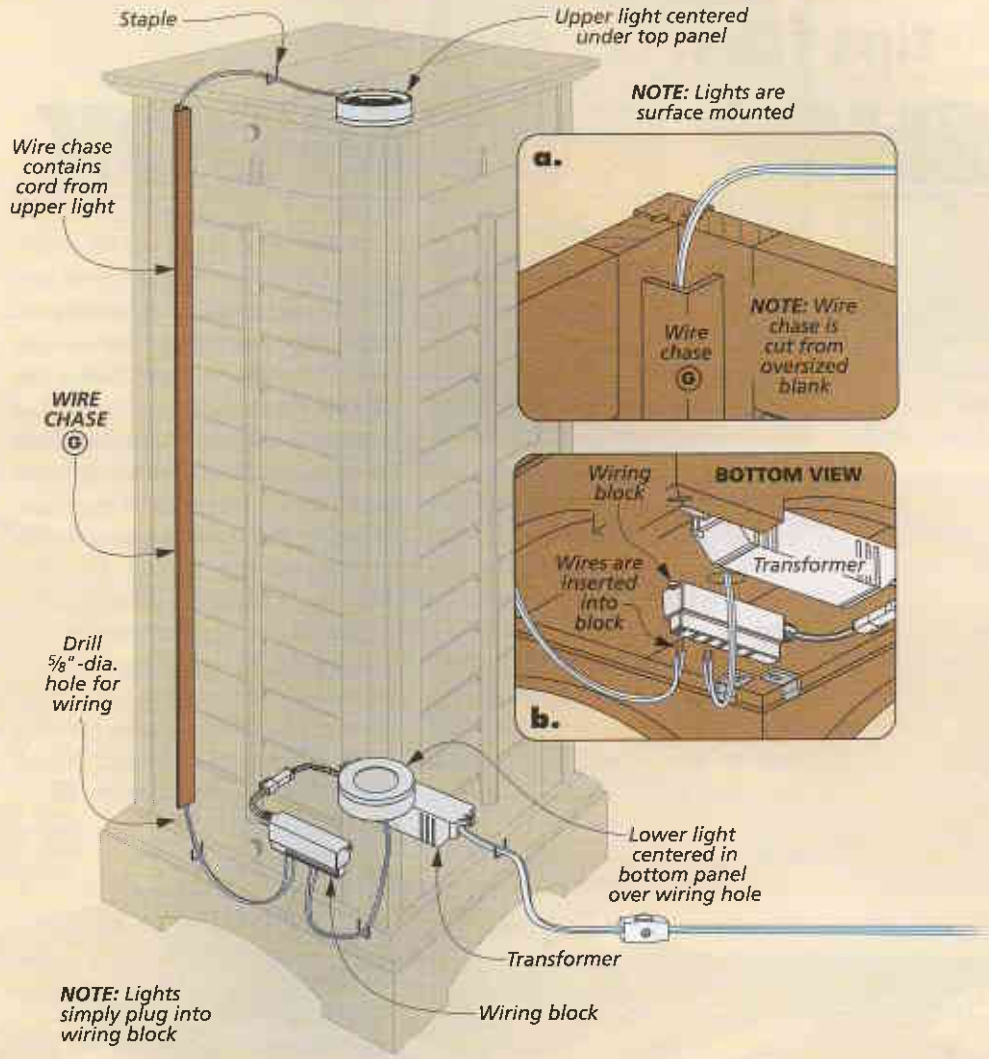
adding LIGHT

With the assembly complete, it was time to make the lamp light up. And this turned out to be easy.

CHOOSING LIGHTS. When deciding how to add light to the lamp, there are a couple considerations. First, in the enclosed space of the lamp tower, heat buildup can be a problem. So small, low-wattage lights are the way to go. A second consideration is how many lights are needed? I settled on two — one at the top and one at the bottom.

THE LIGHTS. Fortunately, I found a simple lighting system that fit the requirements and was really easy to install. The small xenon *Pockit®* light kit that I purchased comes complete with two 20-watt, self-contained lights and a transformer with an attached wiring block.

INSTALLATION. To allow adequate ventilation, I mounted the tranformer and the wiring block to the bottom of the base panel. Then you can surface mount one light in the center of the top panel and the second in the center of the bottom panel over a 3/4"-dia. wiring hole.



WIRE CHASE. Finally I added a *wire chase (G)* to one corner of the lamp. To make this piece, start with an 3/4"-thick oversized blank and cut a 5/8"-square rabbet into one edge. Then rip this edge off to create the 3/4"-square wire chase. (detail 'a'). It's glued into one corner of the lamp over a second wiring hole.

Once all the pieces are in place, plug the lights into the wiring block and give the lamp a try.

DESIGNER'S NOTEBOOK

Louvered Shutters
for your windows

I put the louvered shutters that I built to a pretty unique use, but you can use the same techniques to build them for a more conventional purpose. With a few simple design changes, you can build louvered shutters custom-sized to fit the windows in your home.

If you're interested in building louvered shutters for use in your home, go to the Woodsmith website to find construction and installation information.

Woodsmith GO ON-LINE EXTRAS

SHOP NOTEBOOK

Shallow Mortise Jig

One of my favorite features on the tool cabinet are the false tenons that accent the sides (right photo). They really draw your attention and give the cabinet a "hand-crafted" look.

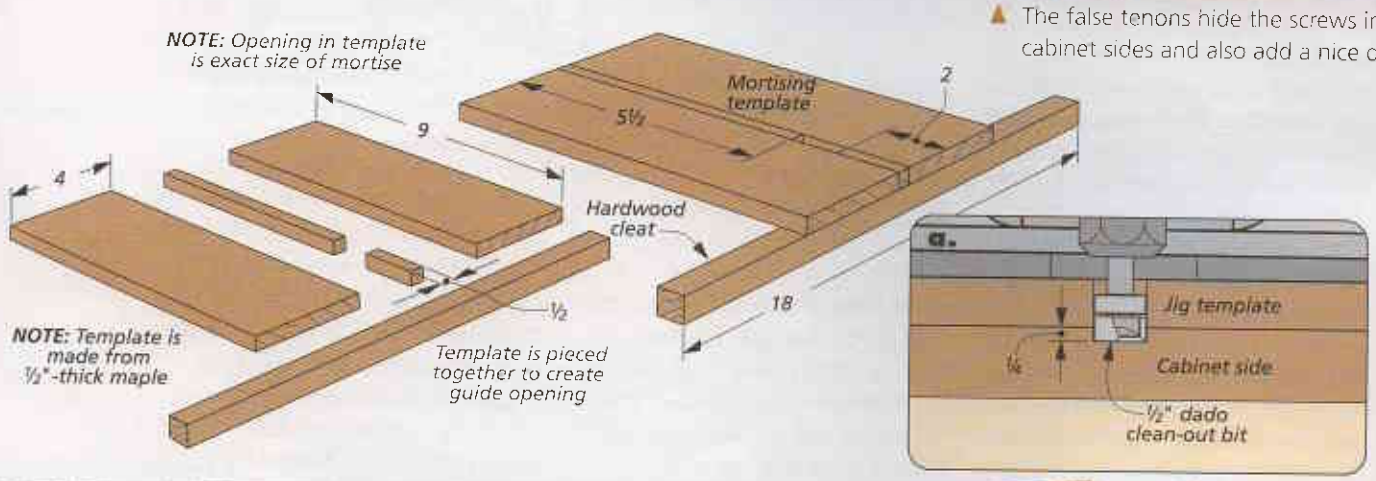
But I didn't want to knock myself out cutting all these mortises by hand. Routing them seemed like the best way to go. And for this job, I built the simple mortise jig that you see in the drawing below.

The jig is designed to be used with the dado cleanout bit shown on page 10. Since this bit will cut flush to the template, the guide opening is sized to the mortise.

The easiest way to create an accurate opening is to piece the template together, as shown in the drawing below. When you glue the pieces together, you can leave an opening the exact length and width of the mortises. A cleat fastened to the template spaces the mortise at the correct distance from the edge of the cabinet sides.

To use the jig, just clamp it in place with the opening over the position of the mortise (detail 'a'). After routing the mortises, I left the jig in place while I used a sharp chisel to square the corners. W

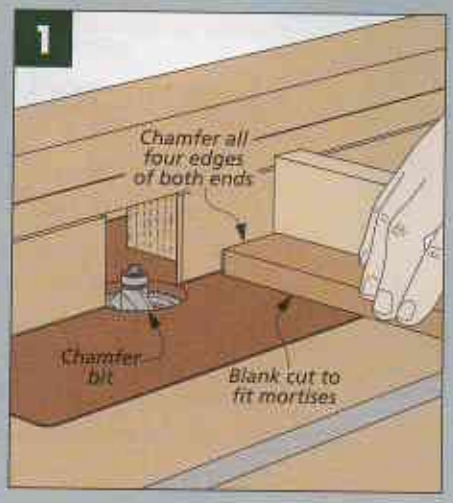
▲ The false tenons hide the screws in the cabinet sides and also add a nice detail.

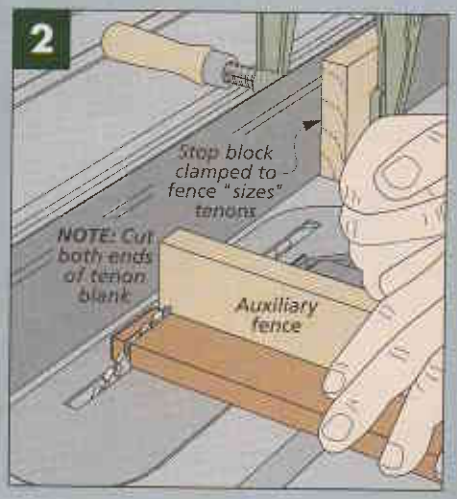


How-To: Make Chamfered False Tenons

The challenge to making the chamfered false tenons for the tool cabinet lies in their small size. Once they're cut to their final ⅜" length, there's just not much to hold on to when trying to chamfer the ends. The solution is to chamfer first, then cut them to length.

I started with a blank of wood sized to fit the mortises and long enough to make all 16 tenons. At the router table, I chamfered all four edges of both ends (Fig. 1). Then I took the blank to the table saw. Here I set up the fence with a stop block in front of the blade (Fig. 2) to gauge the length and cut each end off of the blank. Now repeat the process until all 16 tenons are completed.





Louver Drilling Jig

When building louvered shutters, consistency is a key. All the louvers should be well aligned in the frame for smooth operation. And this drilling jig will help with that task.

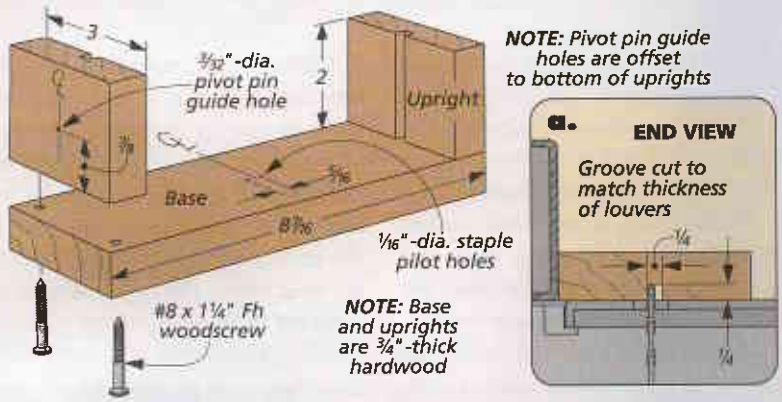
As you can see in the drawing below, all it takes are a few scraps of hard maple. The height of the uprights matches the 2" width of the louver. The centered grooves are sized to hold the louver snug (detail 'a'). And the uprights are mounted on the base to tightly capture the louver between them.

Now you want to drill the guide holes accurately. The 1/16" guide holes for the staple are centered in the base 5/16" apart. The 3/32" guide holes in the uprights for drilling the pivot pin holes are offset toward the base, as shown below.

With the louver held firmly, drilling the two sets of holes accurately is a snap (right photos).

◄ First come the pivot pin holes at the drill press. Tape on the bit is your depth stop.

Next a hand drill at the bench will quickly handle the pilot holes for the staples.▼



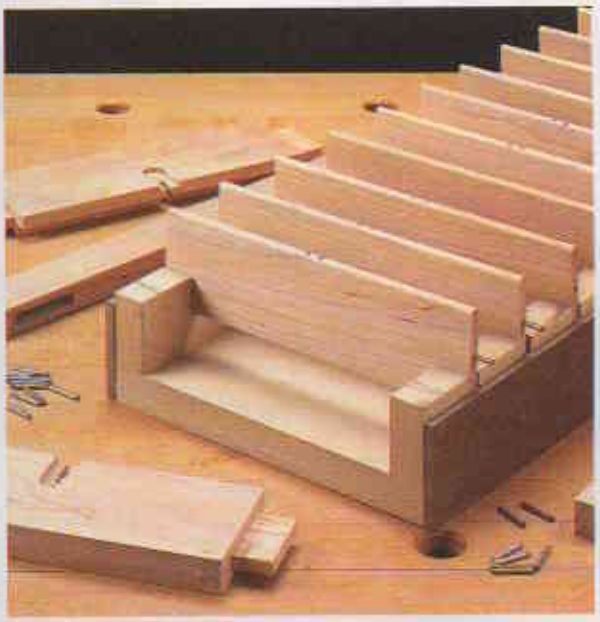
Shutter Assembly Jig

I think you'll find that building this shutter assembly jig is well worth the effort. It makes what could be an awkward job go really smoothly.

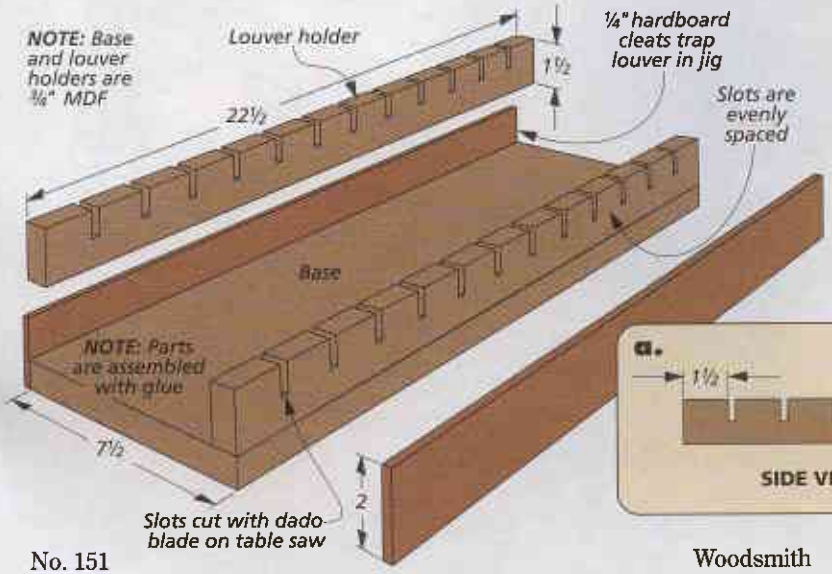
Start by cutting an MDF base. Its width should match the inside dimension of the shutter frame. Next you'll add a pair of louver holders to the base. These two pieces are the key parts of the jig. The slots in the holders will determine the spacing of the louvers, so they need to be cut accurately.

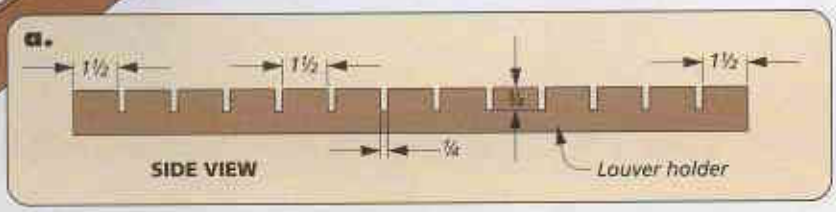
To do this, I cut the two louver holders to size then carefully laid out the position of the slots. After installing a 1/4" dado blade on the table saw, clamp the two pieces together with their ends aligned. Now, using the miter gauge, just cut to the layout lines.

After attaching the louver holders, I added a pair of hardboard cleats. The cleats trap the louvers in the jig and support the shutter frame during the glueup.



▲ This easy-to-build assembly jig will help with several steps in the building process. First use it to mark the position of the pivot pin holes in the stiles. Later, it will make the assembly a breeze.





through tenon Nantucket Bench

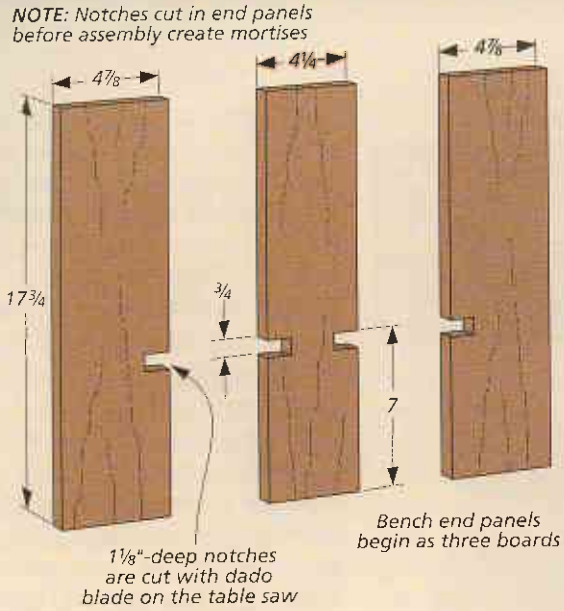
Mortises on the table saw? Why not. This easy-to-build bench gives you the perfect opportunity to try it.

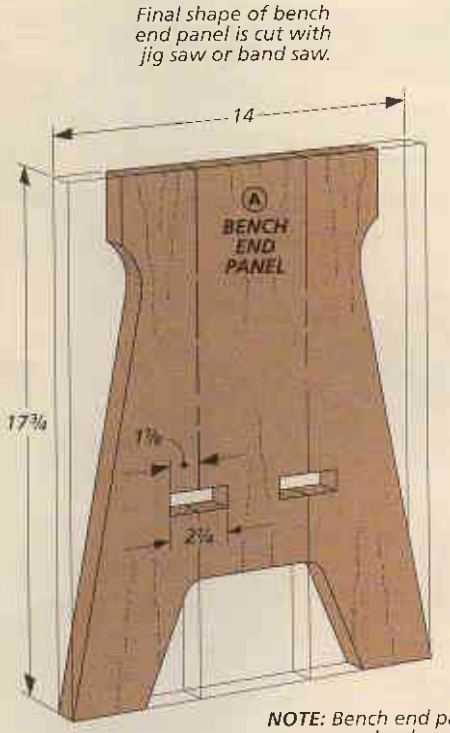
The bench in the photo below is a simple, country classic. I'm guessing it might look kind of familiar. Because this basic style has been used for ages. Two ends, a seat, and a few connecting pieces — that's really about all there is to it.

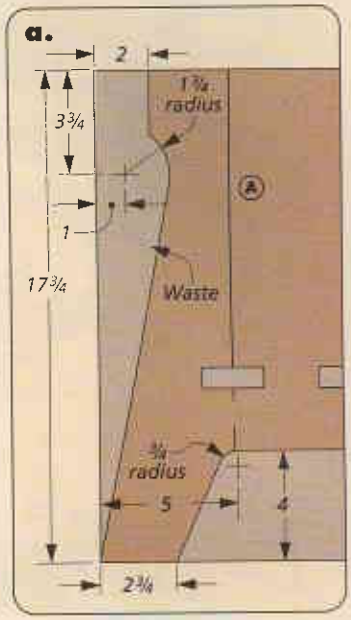
What first catches your eye are the gracefully-shaped end panels that form the legs and the "through-tenons" of the stretcher. This joinery gives the bench the look of a piece that took some extra time and experience to build.

In the past, hand tools would have been used for this task. But there's an easier way to achieve the same results with a lot less work.

Believe it or not, you're going to use the table saw to cut the mortises. As you can see in the drawing at right, the mortises start out as notches cut into the edges of the three separate boards that make up the end panels. When the boards are assembled, the notches align to form the through mortises.







making the ENDS

The first step is to cut the three boards that form each bench end blank to size from 1" stock. You want to make certain the width of the center board is accurate. This will ensure that you end up with the correct spacing between the two mortises.

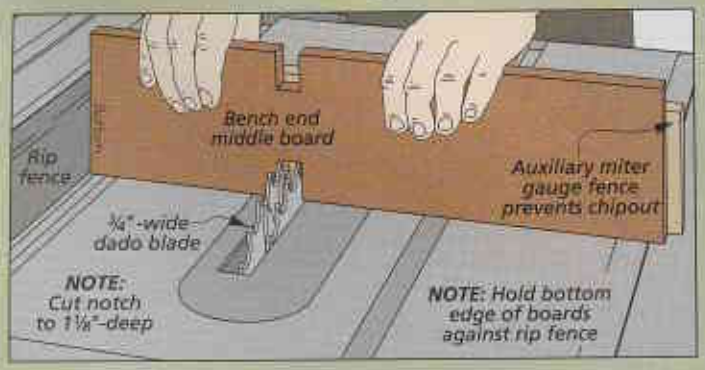
CUT THE NOTCHES. Once the boards are cut to size, you can begin work on cutting the notches that create the mortises. The box below gives you the inside track. But before you get started, take a little time to mark the bottom of each board. When I cut the notches, I made sure to hold the bottom edge of each piece tightly against the rip fence. This way the notches line up to form perfectly-sized mortises.

GLUE UP. Once the notches are cut, you can glue the boards together to form the end panel blanks. I used a simple trick to keep the notches aligned during assembly. Just take some scraps of hardwood and cut "keys" sized to fit the assembled mortises. When they're inserted during the glueup, they'll keep the notches perfectly aligned while the clamps are tightened down. A little wax on the keys will keep them from sticking in the mortises.

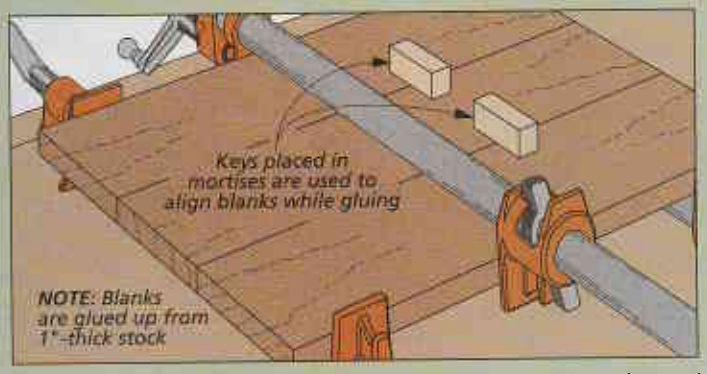
CUT TO SHAPE. When the glue is dry, the end panels can be cut to shape. The shape of the completed bench ends is just a combination of radiused curves connected by straight lines. A compass and a straightedge are all you need for the layout and detail 'a' will provide all the dimensions.

After completing the layout of the end panels, cut them to shape with a band saw or jig saw. A little sanding will smooth the edges.

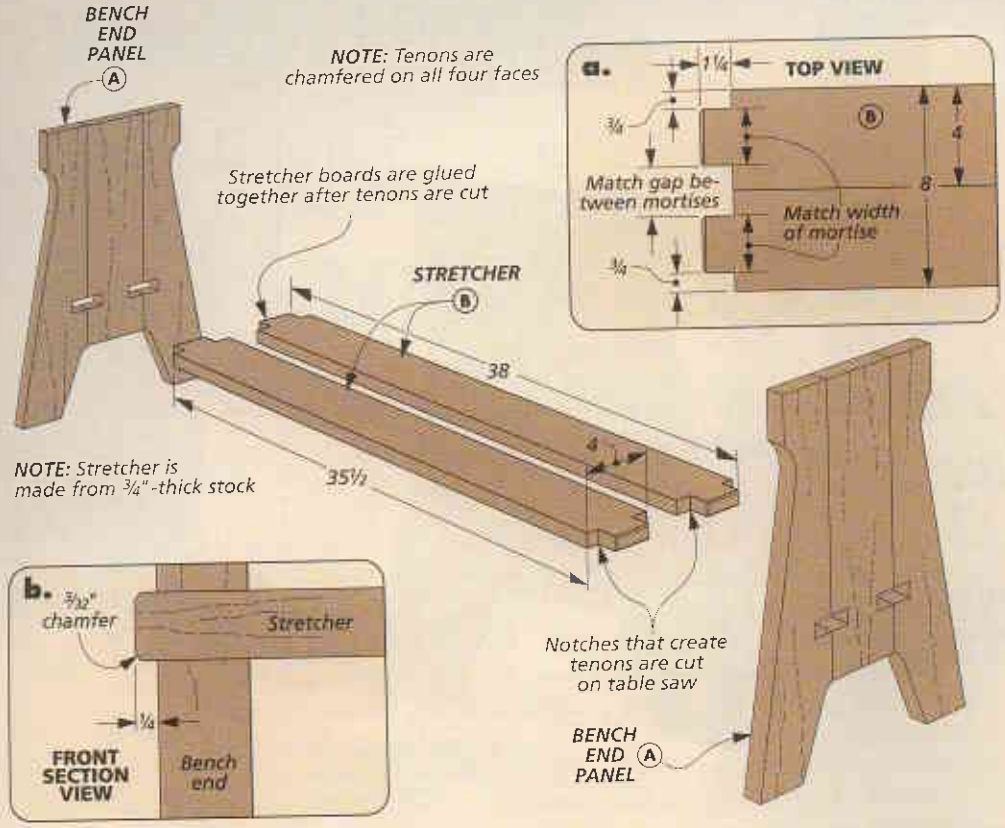
How-To: Making Mortises with the Table Saw



Cutting the Notches. *The table saw, with a ¾"-wide dado blade installed, will make cutting the notches that form the mortises an easy job. With the rip fence as a stop, just sneak up on the height.*



Assembling the End Blanks. *The trick to assembling the end blanks is keeping the notches aligned. Waxed keys inserted before the clamps are tightened down will solve the problem.*



building the STRETCHER

Once the two ends are completed, you can begin work on the "double-tenoned" stretcher that connects them. The drawing above shows the details. Like the bench ends, I made the joinery simple by working on two separate boards. Rather than trying to cut two tenons on a single workpiece, it's much easier to cut a single tenon on two separate pieces. And when the boards are glued together, you'll have a tight fitting, "double-tenoned" stretcher.

TWO BOARDS. The first step is to cut the two boards for the *stretcher (B)* to size from ¾"-thick stock. Now you can put a wide dado blade back on the table saw to cut some more notches. But this time around, notches on the ends of the stretcher boards will form tenons. The box below shows the process.

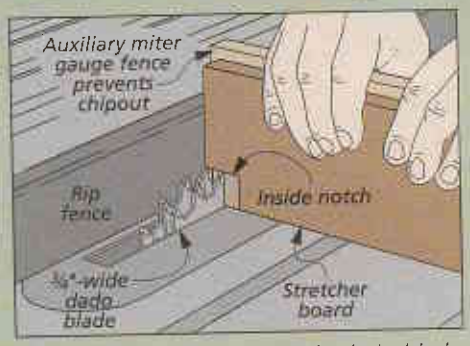
INSIDE NOTCHES. You'll want to start by cutting the notches that create the space between the two tenons. The goal here is to match the distance between the two tenons on the ends of the stretcher (detail 'a') to the distance between the mortises. So just carefully sneak up on the height of the notches and measure the spacing as you go.

OUTSIDE NOTCHES. When you have the inside notches right, you can move on to the outside notches. These notches are not as deep. So first lower the blade and then just repeat the same process. At this stage the tenons will be taking shape, so you can carefully test fit them to the mortises.

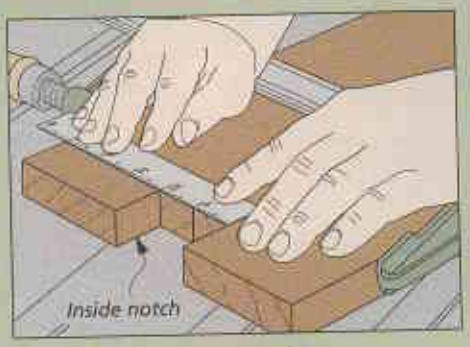
ONE STRETCHER. When the tenons are a snug fit in the mortises, the two halves of the stretcher can be glued together. And here, the trick is to keep the two boards perfectly aligned end to end. To do this, I applied glue and then loosely clamped the two boards together. Then I used a long clamp and a couple of small blocks placed between the two tenons at either end to force the ends flush while I tightened the clamps.

CHAMFER. The final detail on the stretcher is just for show — a small chamfer on the ends of the tenons. The long faces of the tenons can be chamfered at the router table. To chamfer the short faces, where a router bit can't reach, I picked up a sharp chisel (far right photo).

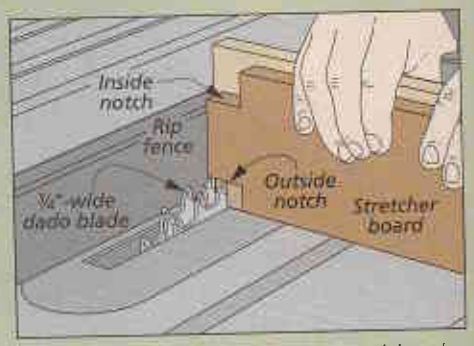
How-To: Cutting the Tenons



Inside Notches. *With a wide dado blade on the saw and the fence set as a stop, sneak up on the height of the notches.*



Check the Gap. *To check your progress, clamp the two boards together and measure the gap created by the notches.*



Final Fit. *When the gap created by the notches is right on, you can complete the tenons by cutting the outside notches.*

adding the SEAT

With the stretcher completed, the hard part is done. And after you've made the support rails and the seat, you can put the pieces together.

MAKING THE SUPPORT RAILS. Your first task is to cut the two *support rails (C)* to size. Now as you see in the exploded view, the rails have a dado at each end that captures the flat edge at the top of the ends. This helps keep the bench square.

After these wide dadoes were cut in both support rails, I cut a miter onto the ends of each piece as shown in the drawing above.

Finally each rail has three deeply counterbored shank holes that will be will be used to attach the seat.

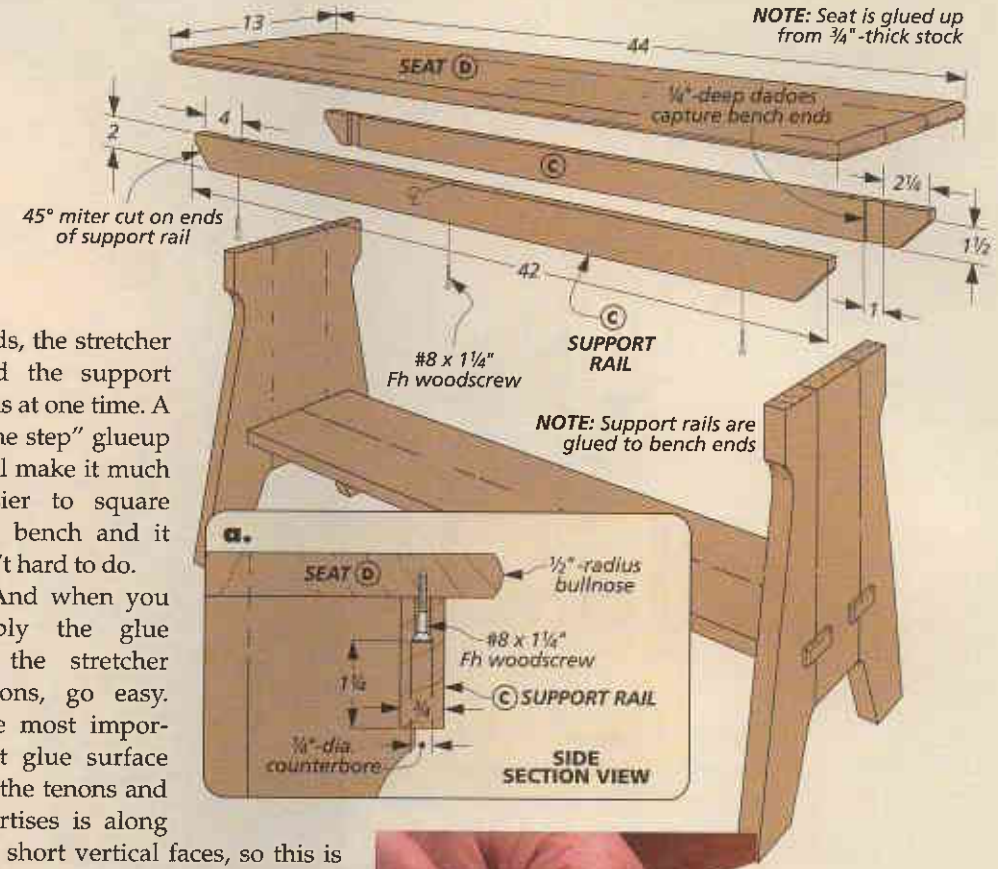
THE SEAT. No bench is complete without a seat. So the *seat (D)* can be glued up from ¾"-thick stock and then trimmed to size. A routed bullnose on the edges will make "the sit" a little more comfortable.

PUT IT TOGETHER. Now the assembly can begin and there are a couple points to remember. First, it's a good idea to assemble the two ends, the stretcher and the support rails at one time. A "one step" glueup will make it much easier to square the bench and it isn't hard to do.

And when you apply the glue to the stretcher tenons, go easy. The most important glue surface on the tenons and mortises is along the short vertical faces, so this is where the glue needs to be.

CLAMPING. Once the stretcher was inserted between the two ends, I tightened a clamp end-to-end along both sides. A couple clamps across the width of the bench will hold the support rails in place.

Finally, with the base assembled, you can lay it upside-down on the seat and fasten the two together with woodscrews (detail 'a'). W



At times, a little hand work is the best answer. With a sharp chisel you can carefully pare from both sides to complete the chamfers on the short faces of the tenons.

DESIGNER'S NOTEBOOK

A Smaller Version

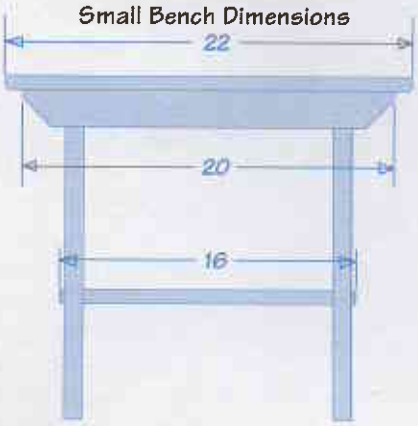
Sometimes the simplest of design changes can give a project a whole new look and function. By taking this design and changing the overall length, the long bench becomes a nicely proportioned "one seater" or even a small side table.

The changes couldn't be easier. All you need to do is shorten the length of the stretcher, the two support rails and the seat by an equal amount. The two ends don't change. And all of the joinery and techniques used will be the same.

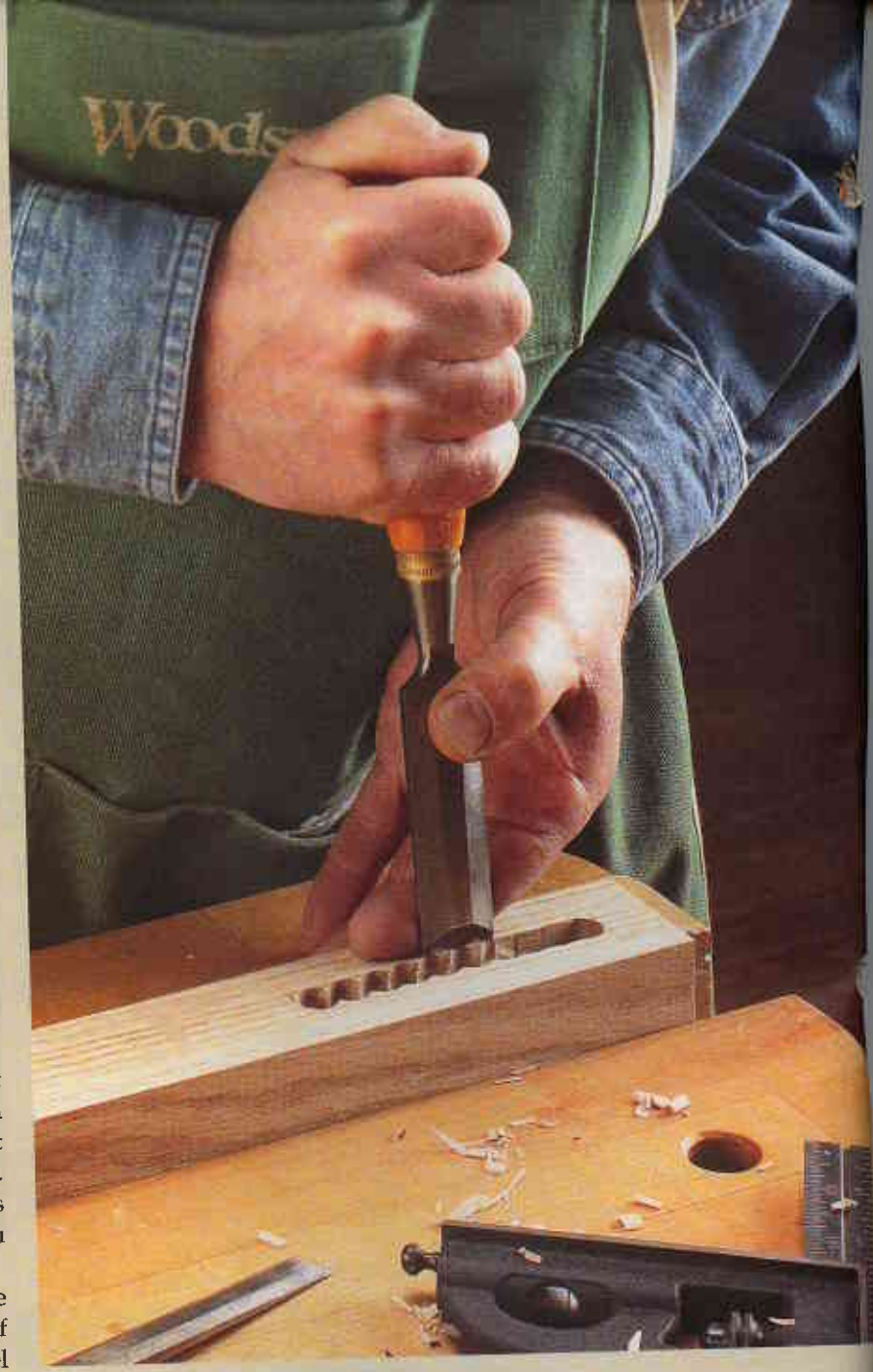
Follow along at *Woodsmith's Video Workshop* and watch how the Nantucket Bench is built.

ONLINE EXTRA video workshop

Small Bench Dimensions



get a grip on Your Chisels



Chisels are one of the oldest and most basic tools you'll find in the shop. And even with all the handy power tools we have today, hand work with a bench chisel is still a pretty common task. Whether it's time spent squaring up a mortise (right photo), or fine-tuning the fit of a mortised hinge, I find myself with a chisel in hand on a regular basis.

When you buy a set of chisels, it won't come with an instruction manual. But this doesn't mean that using a chisel is too easy for words. On the contrary, to get the results you want with your chisels, you need to know the ins and outs.

A GOOD GRIP. It only make sense that one of the fundamentals of hand work or paring with a chisel is the correct grip. To do fine paring work you need a grip that gives you complete control of the tool. This is one of the keys to making a chisel do what you want it to do.

For me, paring is always a two-handed operation. One hand supplies the power, while the other guides the tool. I'm right-handed, so for most cuts, I'll grip the chisel with the butt of the handle firmly in my right palm. The left hand provides the "steering." The position of this hand can vary quite a bit. For some cuts a couple of fingers or your thumb lightly pressing on the top of the blade may be enough to do the job.

For difficult cuts you may want to have several fingers wrapped around the blade. This gives you both control and a little extra power. One of the most natural-feeling and commonly used grips is the blade grasped between the thumb and forefinger. Just keep in mind that it's not "one grip fits all" — it's about control.

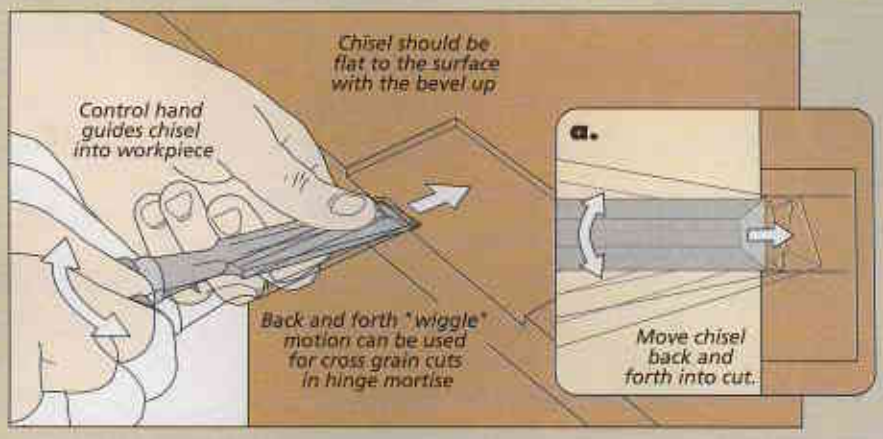
MAKING THE CUTS. A sharp chisel will cut well with the grain, across the grain, or even across tough end grain. But each cut requires a slightly different approach.

ACROSS THE GRAIN. Many of the common cuts you'll make with a chisel are going to be across the grain. The photo above is a good example — cleaning and squaring up a mortise. Here, as you can see, my right hand grip is pretty forceful for the heavier paring cuts involved. My left hand is lightly resting on the workpiece, steadying the chisel and guiding it into the cut. I always try to keep my control hand in contact with the workpiece. This gives you much better control of the cut.

When cleaning out a mortise, the smoothness of the cut isn't as important as its accuracy. The cuts I make are fairly forceful and

straight down into the workpiece. The goal is to knock off the peaks left by the drill bit and leave the sides of the mortise perpendicular to the edge and smooth enough to provide good glue surface.

Another common cross-grain paring task is custom-fitting a mortise to a hinge, as shown in the drawing at right. This job requires a slightly different approach and a lighter touch. A smooth cross-grain cut of this type needs to be very shallow. The flat side of the chisel blade can almost rest on the surface of the wood as you make the cut.



You'll have less chance of tearout and get a cleaner surface if you don't attack the cut head on. One option for this is shown in the drawing. In tight quarters, I'll push the chisel into the cut with a back and forth "wiggle" motion.

A second type of cross-grain cut works well when you have a little more room to maneuver. Pushing the chisel forward and sideways in an arcing motion will give you the smoothest cross-grain cuts.

WITH THE GRAIN. When you're making a paring cut along the grain, as shown in left photo below, you're using the chisel like a small hand plane. The angle at which you hold the chisel controls the aggressiveness of the cut. With the flat side of the blade down, a very shallow angle will produce a fine shaving. As you raise the angle of the blade, the chisel wants to dig in and controlling the cut is more difficult.

Sometimes the workpiece gets in the way and you can't get at a cut from a shallow angle (center photo). The solution is to just flip the chisel "bevel down" and use the short bevel to guide the cut.

And remember that the "lay" of the grain affects the cut. One direction may leave a smooth surface, the opposite might cause tearout.

END GRAIN. End grain is probably the most difficult paring cut. Not because of the technique involved, but just because end grain can be so tough. Here, you're cutting directly across the ends of the wood fibers. And going at them straight on is like trying to push the blade of a knife through a hard crusted loaf of bread. You'll crush the loaf rather than cut through it. But a slicing action will do the job. On end grain, very thin cuts are in order. With a light slicing cut, you'll lift a fine end-grain shaving and leave a surprisingly clean surface (right photo). On end grain, remember to work from both sides to avoid chipout at the edges.

A chisel is really a pretty simple tool to master. Once you pick up the basics, you'll find yourself reaching for one more often. W

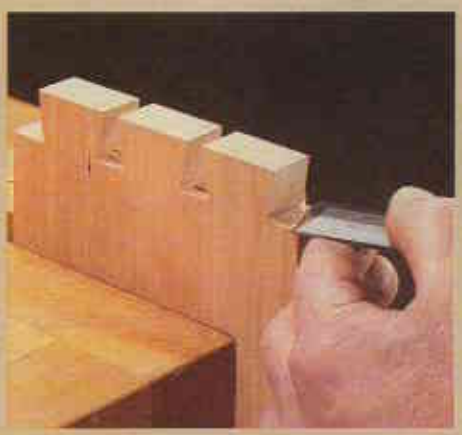
You've read about hand chisel techniques. Now check out *Woodsmith's* Video Workshop to watch how it's done.

ONLINE EXTRA
video workshop

How-To: Simple Paring Techniques

Along the Grain. *For smooth cuts along the grain, a low blade angle is the key. Your chisel will leave a "planed" surface.*

Bevel Down. *At times a low angle cut with the bevel up won't work. So flip the chisel and use the short bevel to guide the cut.*

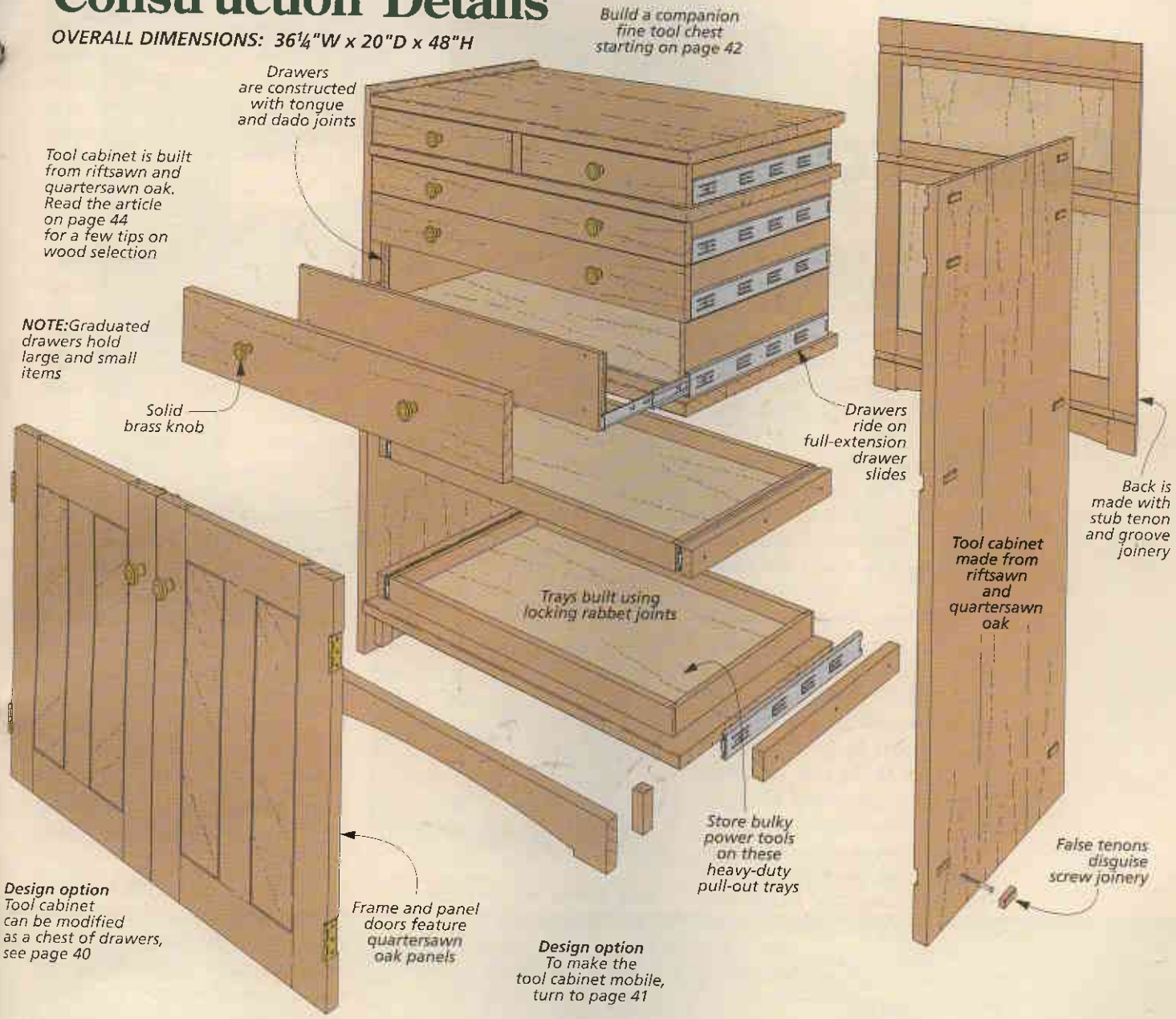


End Grain Shavings. *A shallow slicing action across end grain will allow you to lift a fine shaving and leave a smooth surface.*

classic oak Tool Cabinet

Construction Details

OVERALL DIMENSIONS: 36¼"W x 20"D x 48"H

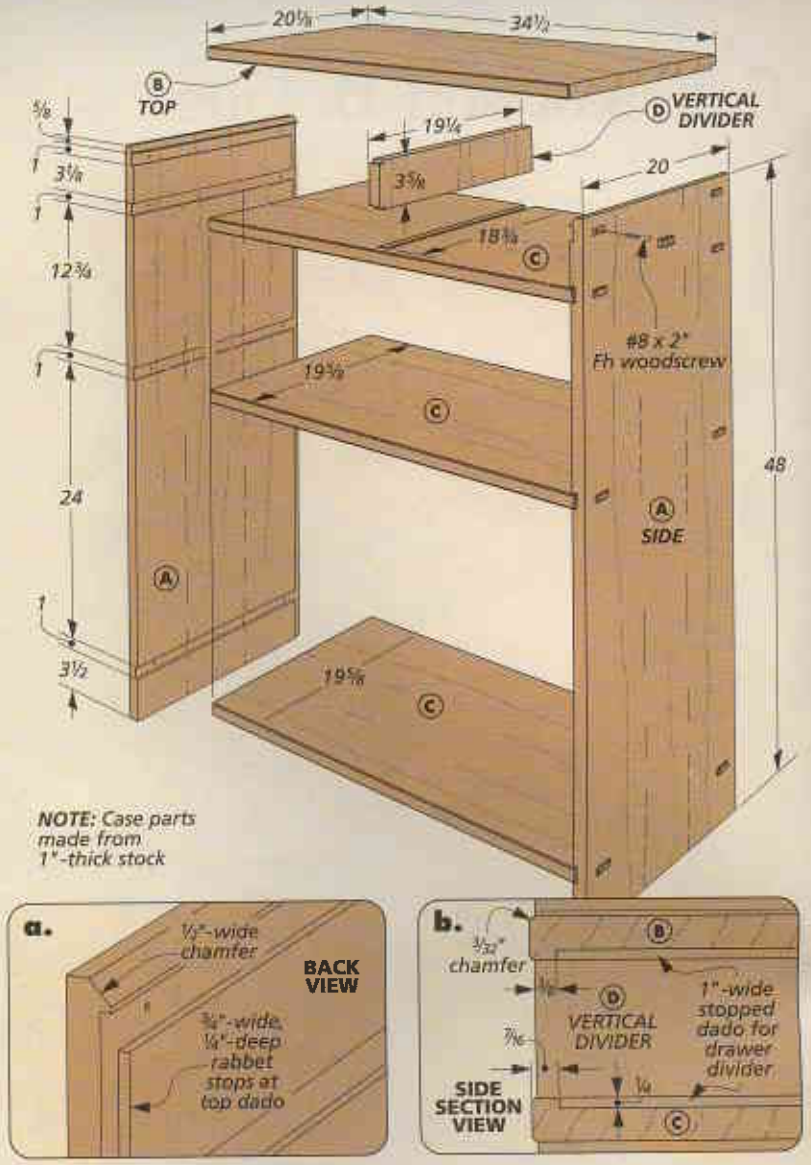


Heavy-Duty Trays *hold portable power tools and other accessories. Now nothing will get lost in the back of the cabinet.*

Easy-Access Drawers *travel on smooth-riding slides. The shallow drawers make finding and organizing tools a snap.*

False Tenons *give the look of more complex through-mortise and tenon joinery. Chamfered edges add a nice detail.*

lower case CONSTRUCTION



I like to think of this tool cabinet as the trusty sidekick to my workbench. I do most of my work at or near the workbench — everything from planing and routing, to trimming joints and assembly. So it's important to have all the tools I need close at hand.

When it comes to building a big project like this, it can be a little intimidating. So I find it's helpful to step back and break it down into sections so you don't get overwhelmed by the details. That's what I did here. The tool cabinet is made up of four different elements: the case, doors, drawers, and trays.

SOLID WOOD CONSTRUCTION. The first section of the cabinet to build is the case, as shown in the drawing at right. Since all the case members are the same thickness, I glued up all the parts at one time.

With such large solid-wood panels, it's a good idea to spend some extra time in selecting and arranging your stock for color, grain, and appearance. You can learn a few tips on wood selection by reading the article on page 44.

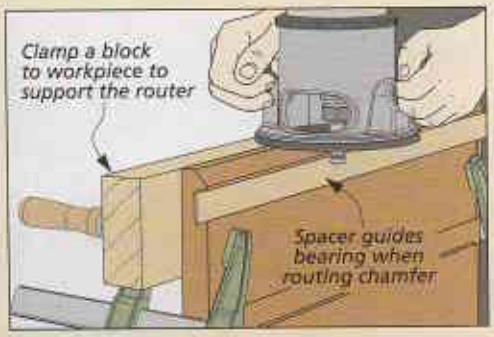
DADO JOINERY. At first glance, it looks like the case is built with through-mortise and tenon joinery. However, the tenons you see are simply plugs. They hide long woodscrews that secure the sides to the horizontal parts. Dadoes on the inside of the case help support the dividers. Using false tenons and screws gives you a traditional look without all the work.

The case is assembled with simple dado joints. You can cut the dadoes with either a table saw or hand-held router. It's not important how you cut the dadoes. But because the ends of the dadoes are visible, it is important that the bottoms of the dadoes are smooth and flat. For more on how to get flat-bottom dadoes (using either method) turn to page 10.

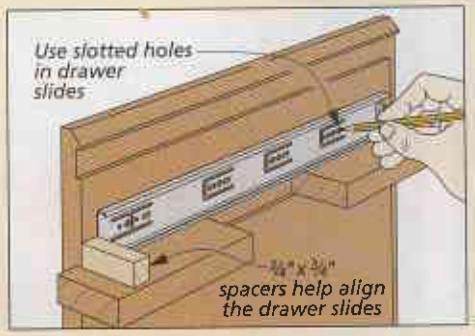
There's just one other thing to mention about the dadoes. They should match the thickness of the stock as close as possible for the tightest, strongest joint.

SIDE DETAILS. Before moving on to the dividers, there are a few more

Shop Tips: Chamfers and Slides



Routing the Chamfer. *A support board clamped to the case side and a spacer in the dado allow you to easily rout the chamfer.*

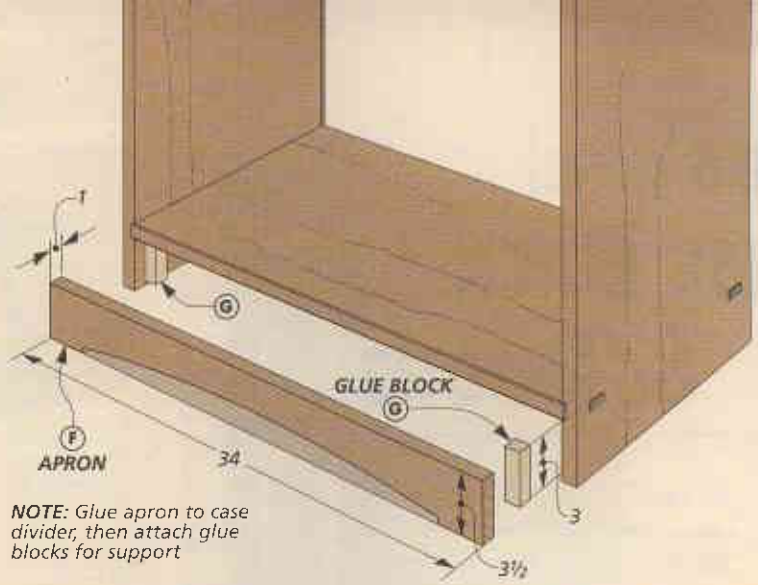


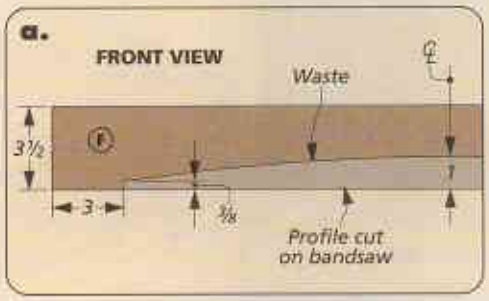
Drawer Slides. *Pre-drill the holes for the top drawer slides before assembly. Support blocks and a spacer keep things aligned.*

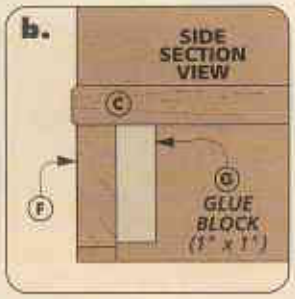
things you'll need to do to the sides. First, cut a chamfer along the top inside edge of each side panel. Take a look at the left box on the bottom of the opposite page for a tip on the best way to do this.

The second thing to do is rout a rabbet on the back edge to hold a frame and panel back that is made later (detail 'a' on the opposite page). This rabbet is stopped at the top divider dado and doesn't run the whole length of the side.

The last thing you'll need to do is rout small mortises in each side to hold some false tenons that hide woodscrews. I used a simple router template to do this. It's shown below and on page 24. Even though the case is going to be glued, the end-grain joints need some screws for reinforcement.







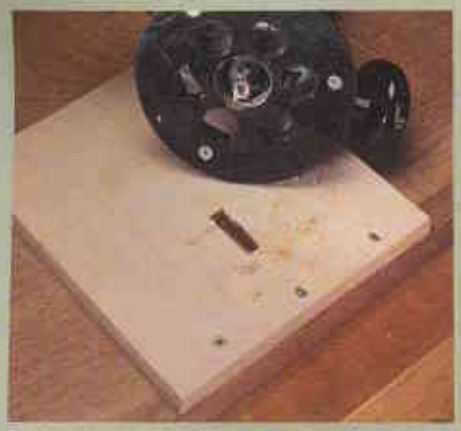
SIMPLE DIVIDERS. At this point, you can set aside the sides and work on the dividers. These are the horizontal panels that make the top, bottom, drawer, and cabinet dividers. You can see the dimensions for each divider in the drawing.

The front edge of each divider sits proud of the case sides and is chamfered on the front. Plus, the case top and upper drawer divider have centered, stopped dadoes cut in each panel to hold a short, vertical divider between a pair of narrow drawers, as you can see in detail 'b' on the opposite page.

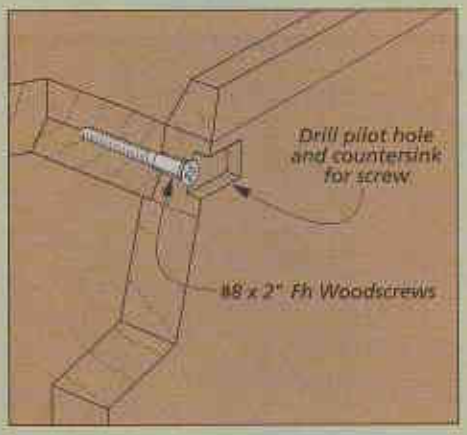
There's one last thing to do before assembling the case. I installed the drawer slides for the two upper drawers. I did this now because after the case is together, it will be nearly impossible to reach in the small opening and drill the holes and align the slides. Take a look at the right drawing on the opposite page to see how I did this. The case can then be assembled.

APRON AND GLUE BLOCK. To complete the front of the case, I added an apron at the bottom, as in the drawing above. It has a shallow arch and is glued to the divider above and a pair of glue blocks.

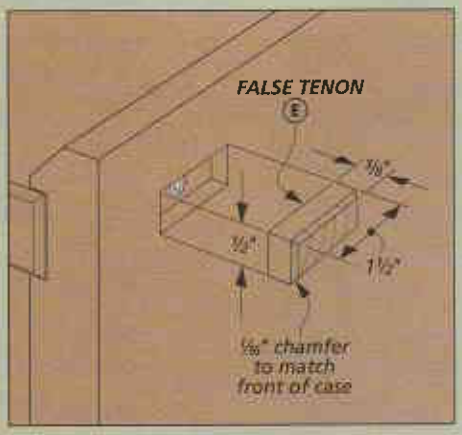
How To: Hiding Screw Joints With False Tenons



▲ A simple router template and a hand-held router are all it takes to cut the shallow pockets for the false tenons. To find out how to make the template, turn to Shop Notebook on page 24.



Woodscrew Reinforcement. *After routing the pocket for the false tenon, square up the corners with a chisel and drill a countersunk shank hole and pilot hole for the 2"-long woodscrew.*



Hide the Screws. *Chamfered false tenons fit snugly in the pockets routed in the cabinet sides and hide the woodscrews. Once they're made (turn to Shop Notebook on page 24), simply glue them in place.*

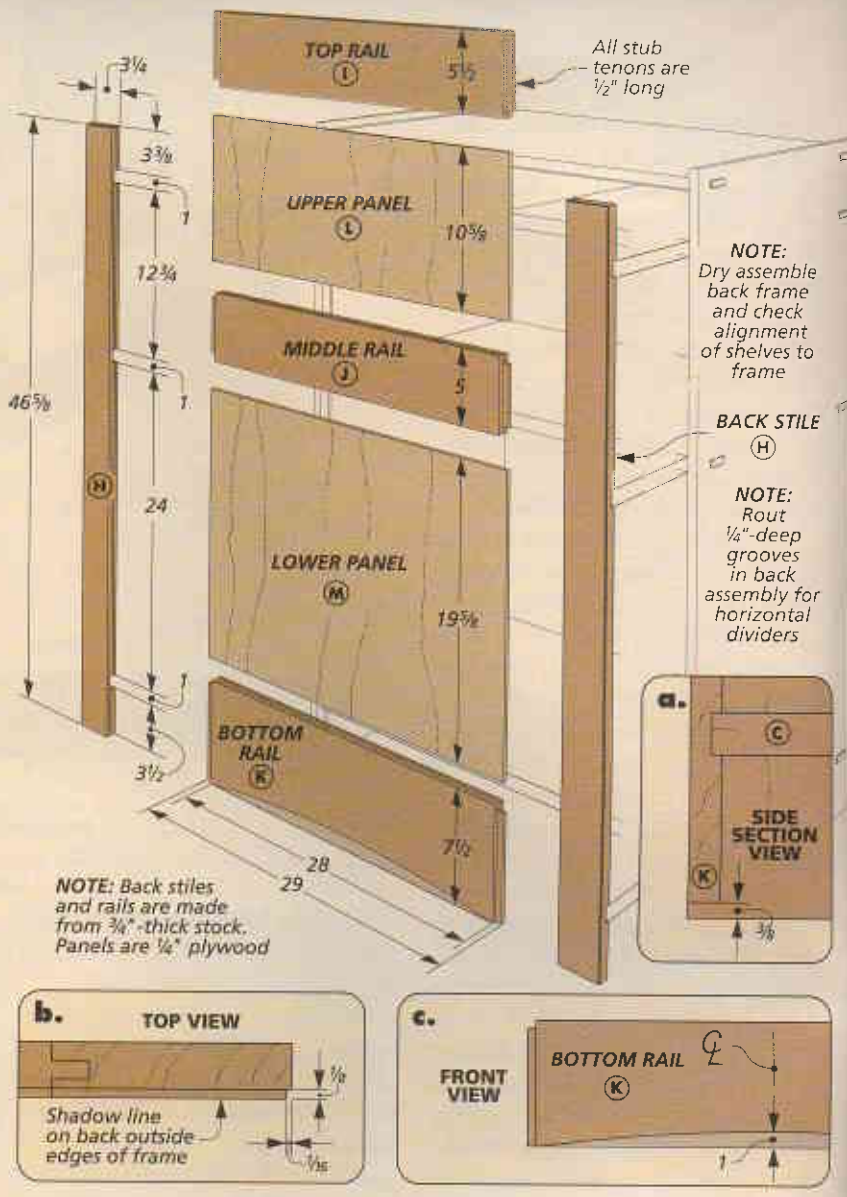
frame & panel
CASE BACK & DOORS

All that remains to complete the case of the tool cabinet is the back. The back assembly is made with simple stub tenon and groove joints. For step-by-step instructions on how to make this strong joint, take a look at the "How-To" below.

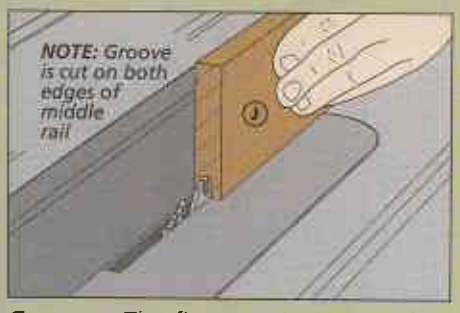
STRENGTHENING THE CASE. Besides closing in the case, the back also adds strength. You can see what I mean in the exploded view at right. First, it fits into the rabbets cut in the sides of the case. This prevents the case from racking. After the back is glued up, a series of dadoes and grooves are cut to fit over the horizontal dividers to keep the large case rigid and square.

BUILDING THE BACK. I began by cutting grooves on the inside edges of the stiles and rails. Then stub tenons can be cut on each end of the rails. Note: The joinery for the door frames is identical to the back. To save time, you could cut the door rails and stiles here as well.

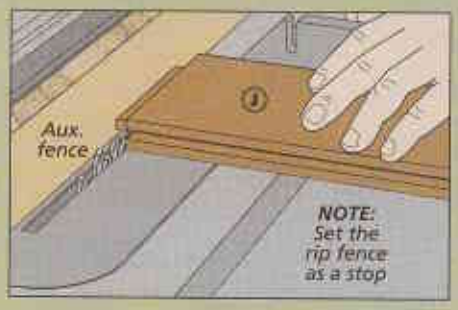
Once the joinery is complete, I cut a small arch in the bottom rail to match the front skirt, as shown in detail 'c.' Finally, 1/4" plywood panels are cut to fit the grooves. Now the back assembly can be glued together (including the panels). Note: Bottom Rail (K) sits 3/8" up from the end of the rails, as in detail 'a.'. Finally, I routed grooves to fit over the dividers and a small shadow line around the outside edges, as in detail 'b.'



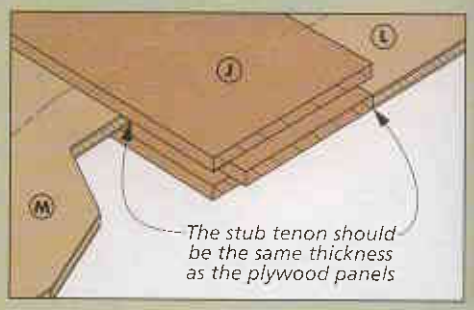
How-To: Stub Tenon & Groove Panels



Grooves. *The first step is to cut a 1/2"-deep, centered groove on the inside edge of the rails and stiles. The groove is sized to match the thickness of 1/4" plywood.*



Tenons. *The next step is to cut the stub tenons on the ends of the rails. Position the rip fence as a stop and cut the stub tenons with a dado blade.*



Panels. *The center panels are sized to fit between the stiles and rails. Plywood panels can be glued in place. Solid-wood door panels are allowed to "float" in the grooves.*

Solid-Wood Doors

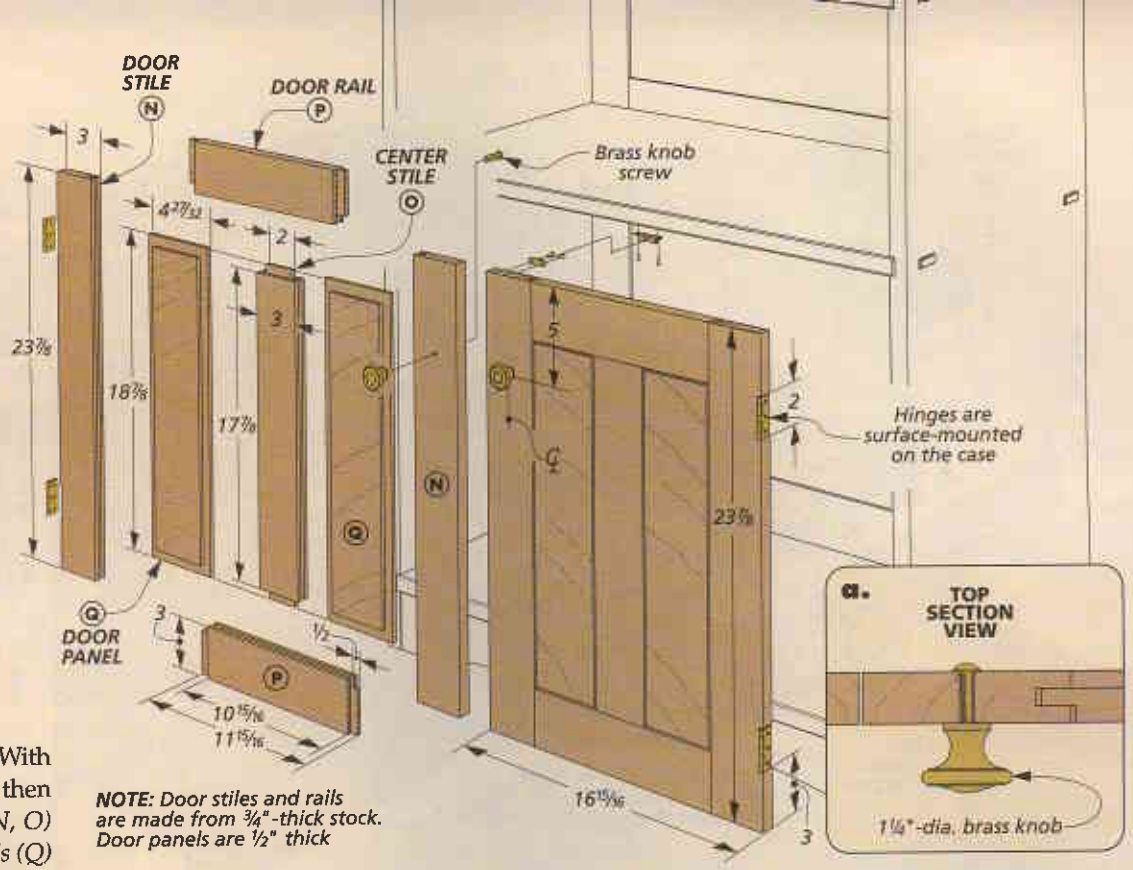
With the case complete, I moved on to building the doors. Like I mentioned earlier, the joinery here is the same as the case back. There's one difference between the doors and the back. The panels in the doors are solid wood, instead of plywood. They're solid wood for appearance. I wanted them to look as good when they were open as closed. And to make them stand out from the frame, I selected straight-grained (riftsawn) stock for the frame parts and used highly figured quartersawn wood for the door panels.

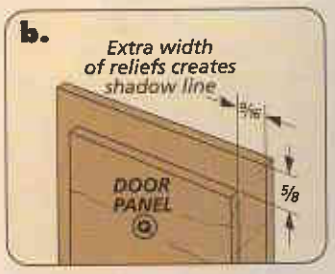
DEALING WITH WOOD MOVEMENT. With the parts cut to size, you can then cut the joinery on the *stiles (N, O)* and *rails (P)*. Because the *panels (Q)* are solid-wood pieces, they are cut slightly narrower than the grooves so they can expand and contract.

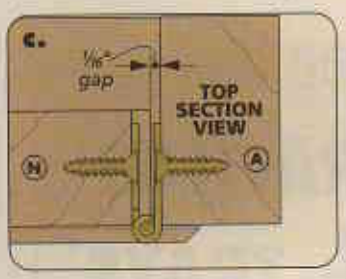
Next, I cut a rabbet on all four sides of the panels to form a tongue, as in detail 'b.' The rabbets are cut a little wider than the grooves to create a shadow line so that they stand out even more.

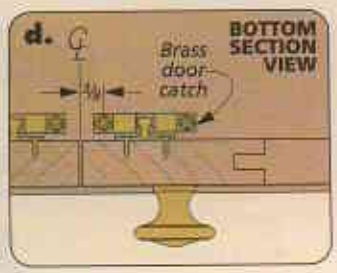
At this point, you can assemble the doors. I applied glue only to the stiles and rails. The panels need to "float" in the grooves to expand and contract. But to keep the panels centered in the frame, I applied a dot of glue at the top and the bottom of the panels and used some spacers while clamping. It's also a good idea to stain them as well, as you can see in the shop tips below.

HANGING THE DOORS. The doors can now be hung in the case. To do this, I cut shallow notches in the sides of the doors, as in detail 'c,' to hold the hinges. The notches are 1/8" less than the thickness of the hinge knuckle. The hinges will be surface mounted on the inside of the case. Then the doors can be trimmed to fit. All that's left is to attach the knobs and catches, as in detail 'd.'

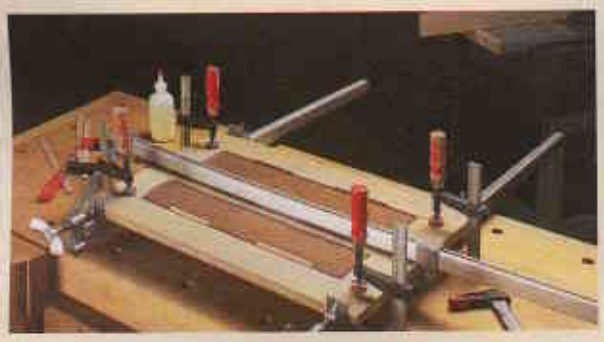






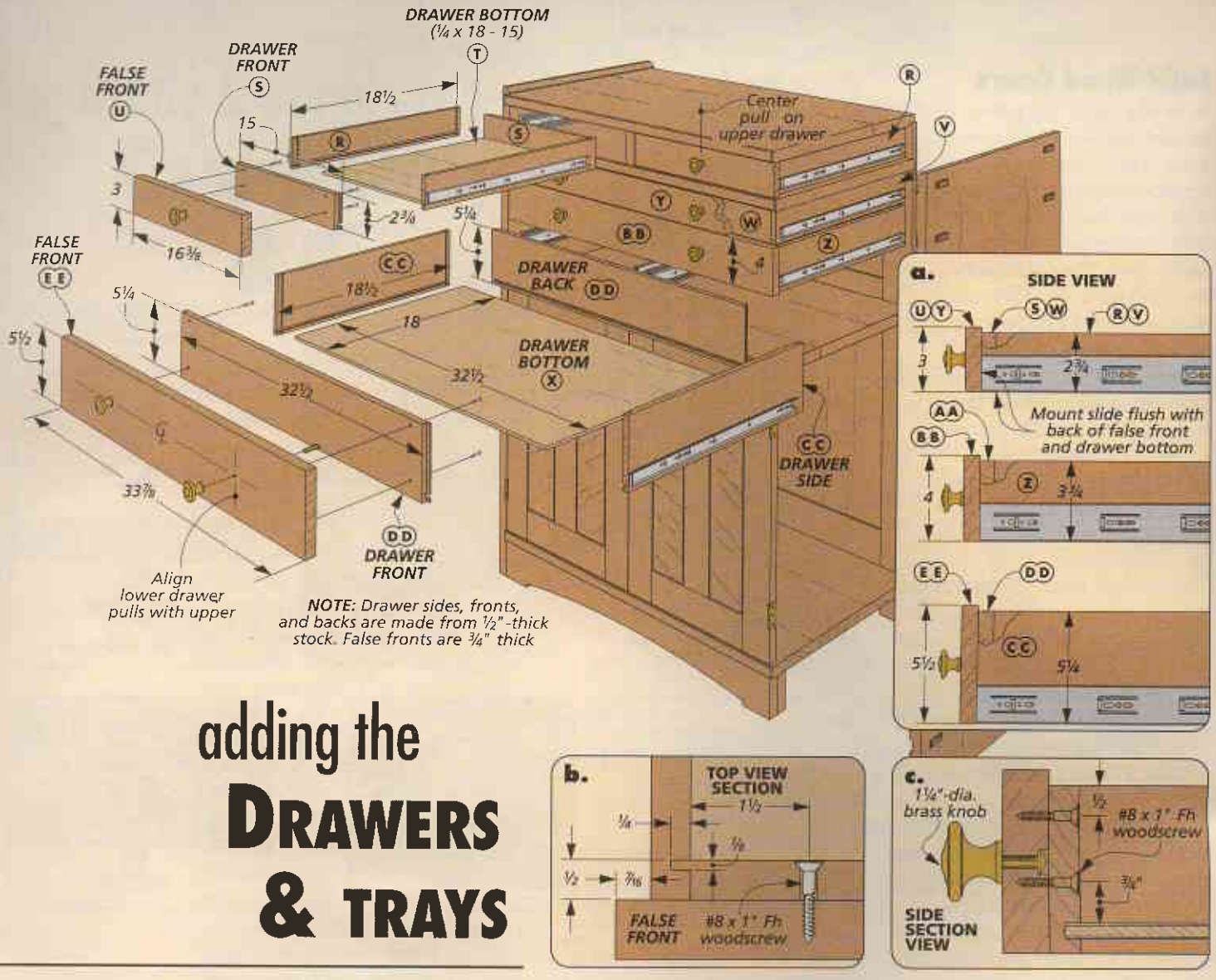


Shop Tips: Great Panels



▲ To keep the panels centered in the doors, I placed a dot of glue in the center of the tongue and used thin spacers while gluing up the door.

▲ Staining the panels before assembling the doors prevents unfinished areas from appearing as the panels expand and contract seasonally.



adding the DRAWERS & TRAYS

At this point in the construction, the tool cabinet is nearly complete. All that remains is to build the drawers and trays. The upper portion of the tool cabinet contains five drawers.

Shop Tip: False Front Fit

▲ *A few strips of carpet tape keep the false front positioned for the proper gaps and hold it firmly in place for drilling the screw holes.*

The two trays divide the space behind the doors in the bottom of the cabinet (more on that later). Both the drawers and trays ride on full-extension, metal slides. While the construction is similar, there are a few differences to point out.

SIMPLE CONSTRUCTION. The drawing above shows how the drawers are made. Each drawer is nothing more than a shallow box with a false front. I built the box from maple and the false fronts from quartersawn white oak.

The boxes are built with simple tongue and dado joinery, as shown in detail 'b.' A dado is cut at the front and back of each side. A matching tongue is then cut on each end of the front and back.

Once the joinery is cut, you can then cut a groove on the inside face of all the parts to hold a ¼" plywood bottom. Then the drawer boxes can be glued up.

The next step is to attach the drawer slides. The full-extension slides come in two parts. One part is screwed to the side of the case. The second part is attached to the bottom edge of the drawer box.

FITTING THE FALSE FRONTS. Once the drawers are in place, I made and attached the false fronts. I wanted to end up with a 1/16" gap on all four sides (to match the doors) so I cut the false fronts slightly oversize and trimmed them to fit the opening. The photo at left shows a simple way to position the false fronts. When the false front is in the right spot, the tape holds it in place for drilling the screws holes, as shown in the tip at left. The last thing to do before attaching the false fronts, is to add the pulls, as in detail 'c.'

Heavy-Duty Trays

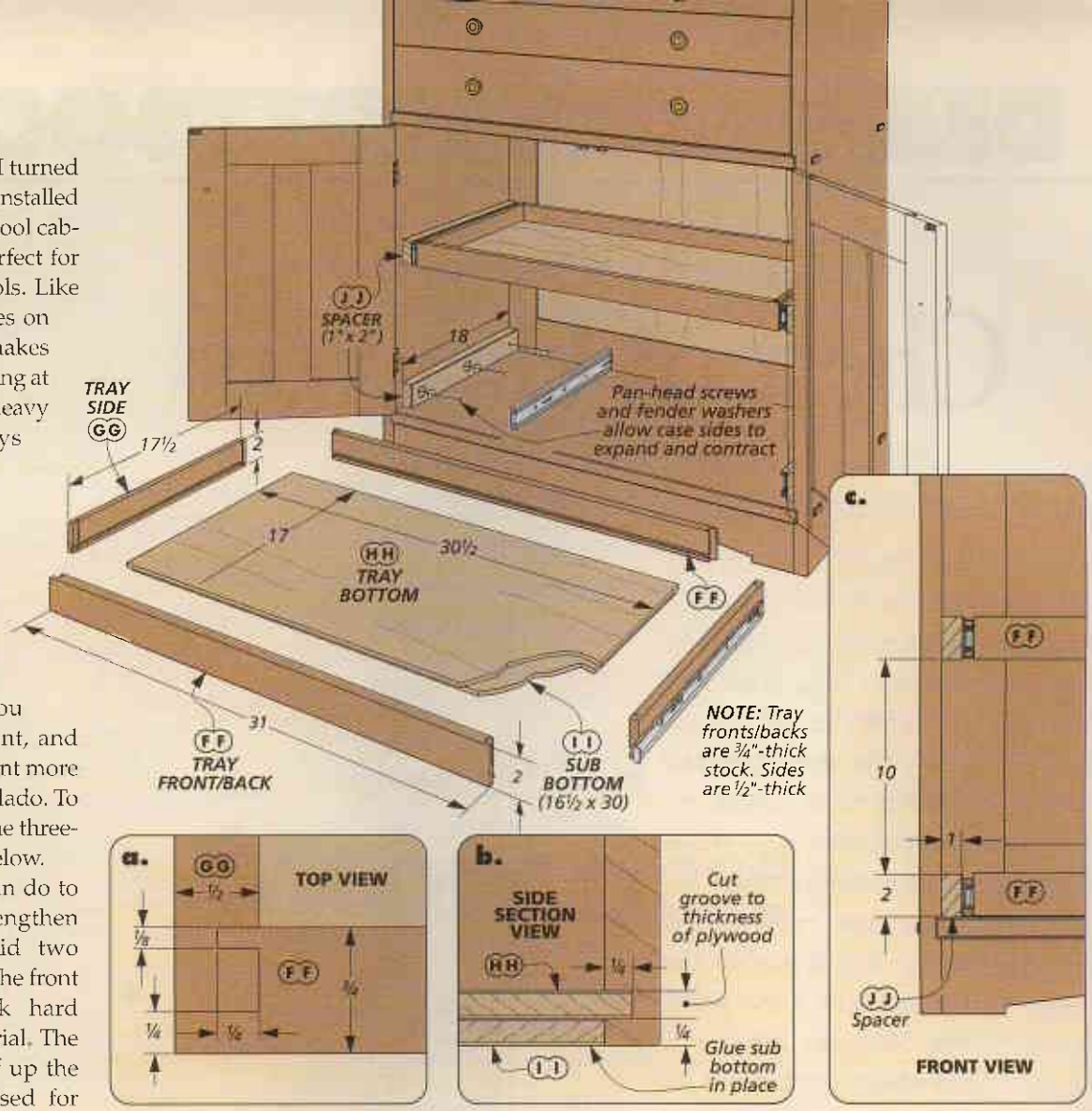
After making the drawers, I turned next to the trays that will be installed in the lower portion of the tool cabinet. This large space is perfect for storing portable power tools. Like the drawers, each tray rides on full-extension slides. This makes it a lot easier to find something at the back of the tray. Storing heavy tools here means the trays need to be strong enough to stand up to the weight.

BUILT FOR STRENGTH. There are two things you can do to beef up the construction. The first is the joinery. For the trays, I used a locking rabbet. In detail 'a,' you can see that the sides, front, and back interlock to create a joint more rugged than a tongue and dado. To make this joint, check out the three-step process that you see below.

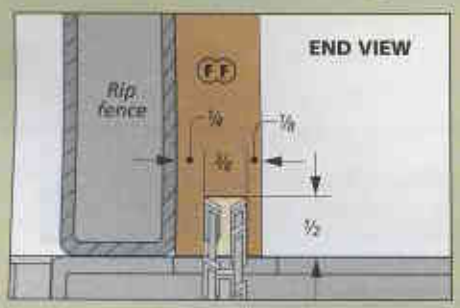
The second thing you can do to beef up the trays is to strengthen the materials. Here I did two things. The first is to make the front and back from ¾"-thick hard maple instead of ½" material. The other thing I did was beef up the ¼" plywood normally used for drawer and tray bottoms.

To reinforce the tray bottom, I made it out of a double layer of ¾" plywood. The first layer is glued into a ¼" groove cut in the tray sides, front, and back. The second layer is then cut to fit underneath the first, as shown in detail 'b.' This makes the tray bottom much more rigid and less likely to flex under a heavy load of tools.

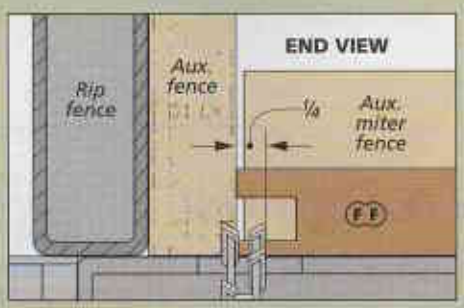
MOUNTING THE TRAYS. Finally, I installed the trays. In order for the trays to clear the doors, they're mounted to a pair of spacers (detail 'c'). The spacers are attached with screws and washers in oversize, counterbored holes to allow the case to expand and contract. W



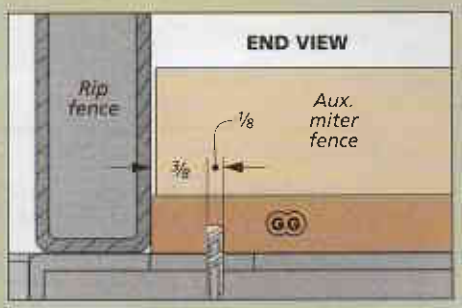
How-To: Locking Rabbet Joint



Slot. *To make a locking rabbet, start by cutting a slot in each edge of the front and back. The depth of the slot should match the thickness of the sides.*



Tongue. *Next, cut the inside tongue of the slot back. I set the rip fence as a stop and supported the workpiece with an auxiliary fence on the miter gauge.*



Dado. *The final step is to cut a dado in the side pieces. The dado should match the tongue on the front and back. The remaining tongue should just slip inside the slot.*

high-style Chest of Drawers

Even though it's a shop project, the heirloom tool cabinet looks good enough to be a piece of furniture. And with a few changes, you can easily transform this tool cabinet to a handsome chest of drawers, as shown in the drawing at right.

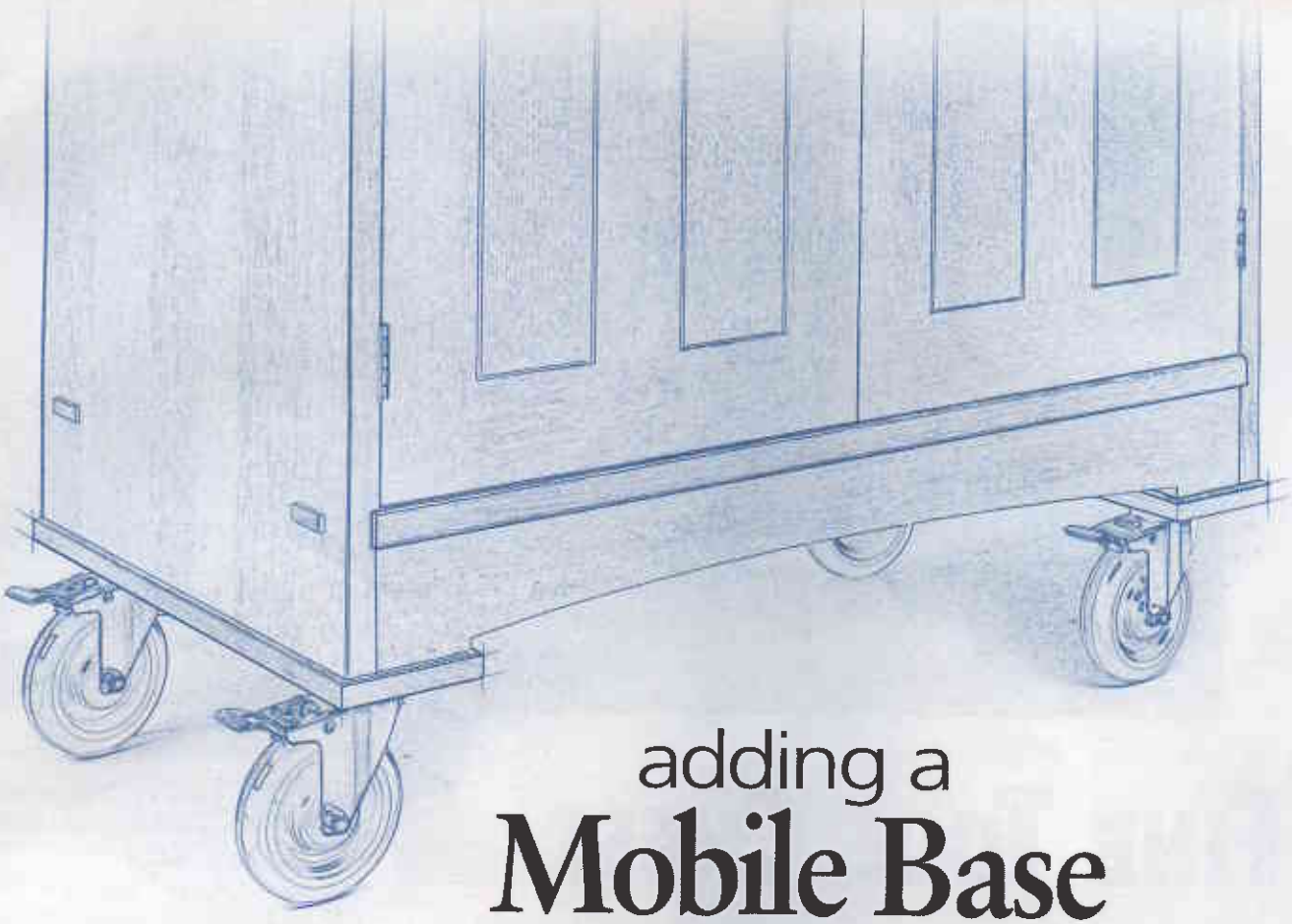
You can replace the doors and trays at the bottom with a few drawers. Since the drawers in the upper part aren't all the same size, it's a good idea to size the new drawers a little different as well. The first two, lower drawers are a little deeper than the ones above it. And the bottom drawer is even larger. To keep things simple, they all share the same construction as the five upper drawers.

Added Materials & Supplies

To download a free Cutting Diagram for this project, go to: www.Woodsmith.com

Woodsmith GO ON-LINE EXTRAS

A Drawer Sides (4)	½ x 6¾ - 18½	**F** Bottom Drawer Fronts/Backs (2)	½ x 9½ - 32½
B Drawer Fronts/Backs (4)	½ x 6¾ - 32½	**G** Bottom Drawer False Front (1)	¾ x 9¾ - 33⅞
C Drawer Bottoms (3)	¼ ply. - 18 x 32½	• (3 pr.) 18" Full-Extension Drawer Slides w/Screws	
D False Fronts (2)	¾ x 7 - 33⅞	• (6) 1¼" Bright Brass Knobs w/Screws	
E Bottom Drawer Sides (2)	½ x 9½ - 18½	• (12) #8 x 1" Fh Woodscrews	

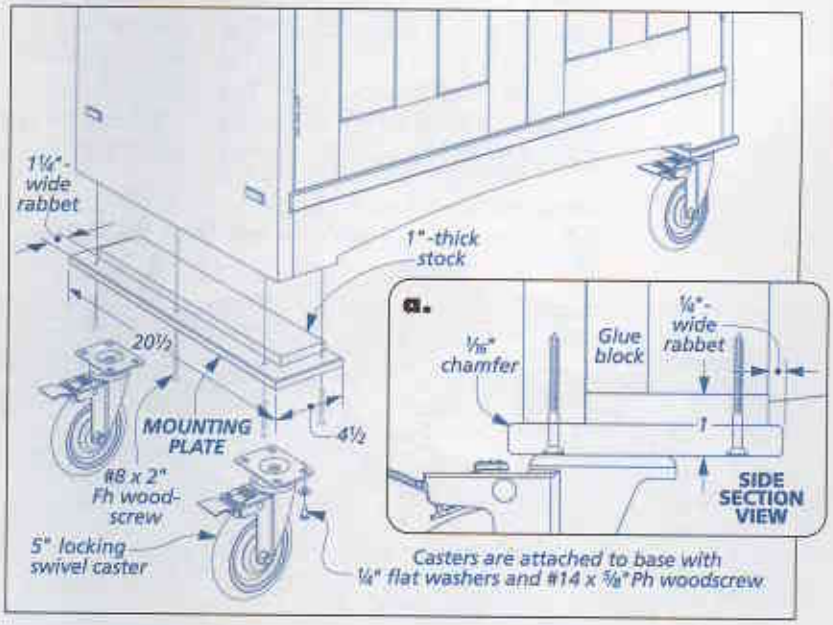


adding a Mobile Base

Positioning the tool cabinet near your workbench is a great way to keep your tools organized and close at hand. But sometimes it's nice to have those same tools close by when you're working on the other side of your shop.

To get around this problem, I added four casters to make the tool cabinet mobile. In the drawing at right you can see what I'm talking about. The casters make it easy to roll the cabinet wherever you need it. They should also be large enough to roll over power cords and other stuff laying around on the floor.

For better balance, the weight of the cabinet should be distributed evenly over the casters. To do that, the casters are attached to a pair of mounting plates. To keep the plates in place, there's a wide rabbet cut on three sides. This rabbet registers against the front, back and sides. Then to keep the plates from sticking out like a sore thumb, they should share the same chamfer details as the rest of the cabinet.



Added Materials & Supplies

A Mounting Plates (2) — 1 x 4½ x 20½

- (10) #8 x 2" Fh Woodscrews
- (4) 5" Locking Swivel Casters
- (16) #14 x ⅝" Ph Woodscrews
- (16) ¼" Flat Washers

Fine Tool Chest

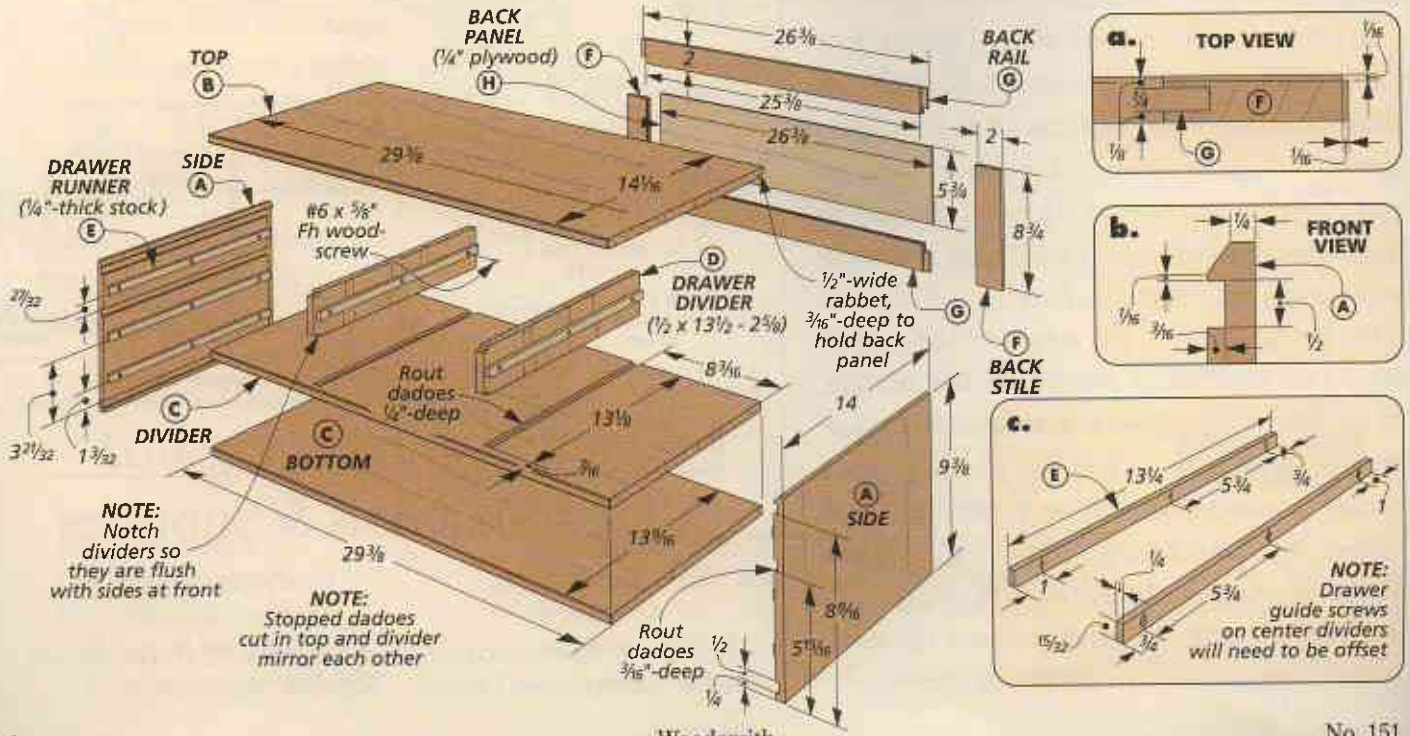
It's the perfect place for your best hand tools and works great alone or sitting on the tool cabinet.

When it comes to keeping and organizing my favorite hand tools, I wanted to make a special case for them. So I built this tool chest. You can build it to sit on top of the tool cabinet shown on page 32, or your workbench. The construction of this chest is very similar to the tool cabinet — just on a smaller scale, as in the exploded view below.

BUILDING THE CASE. To build the tool chest, I started by assembling the case. The 1/2"-thick top, bottom and divider are joined to the chest sides with 3/16"-deep dadoes.

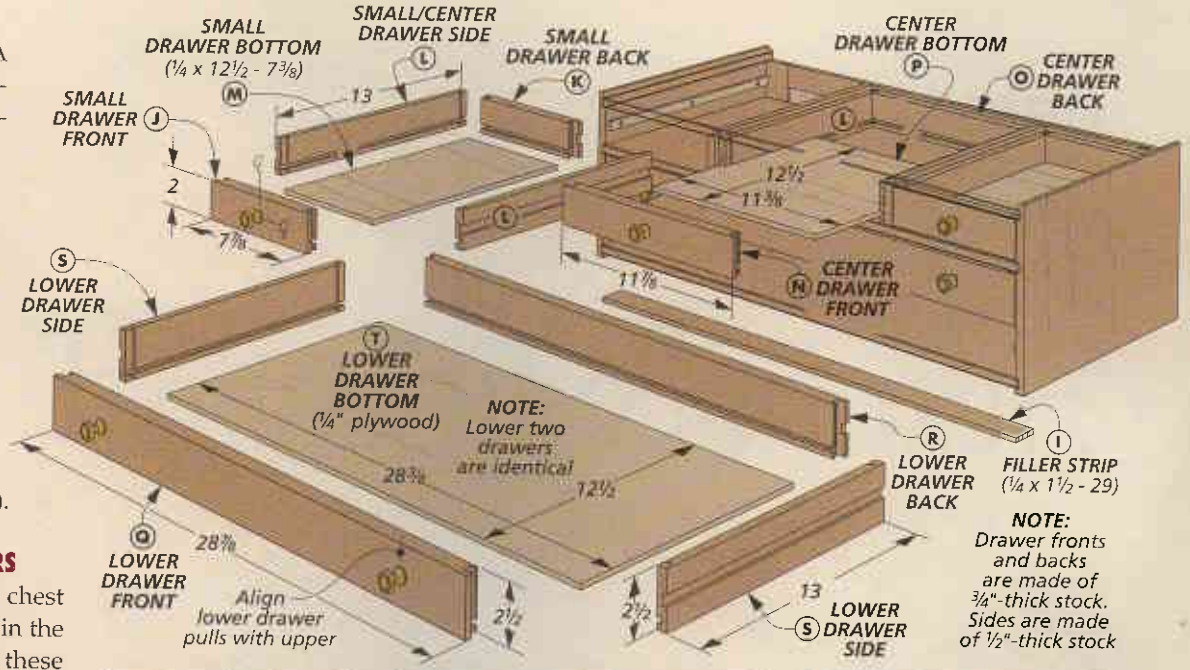
A pair of stopped dadoes in the top and divider hold drawer dividers for three narrow drawers. They're notched at the front so that they'll sit flush with the sides, as in the exploded view. The horizontal parts all have a small chamfer cut on the front edges to match the chamfer on the top of the sides.

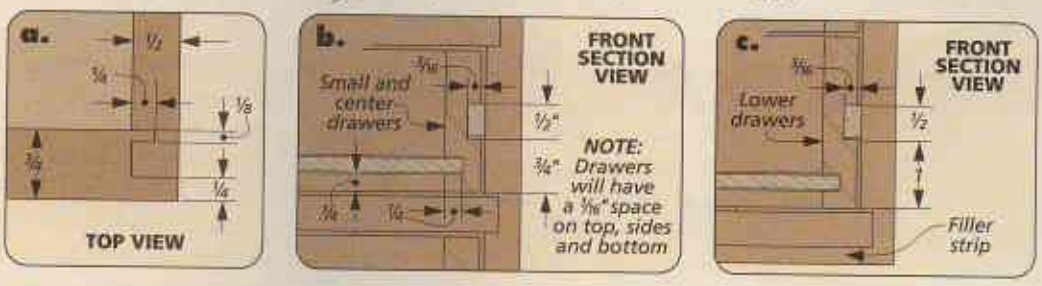
The frame and panel back of the tool chest is glued into a stopped



rabbet cut in the case sides. A small rabbet cut on the outside edges of the frame creates a shadow line, as in detail 'a' on page 42.

Before the case can be assembled the drawer runners should be installed, as in detail 'c' on the opposite page. The openings are too small to do this after the case is glued up. The last piece to install on the case is a small *filler strip (I)* under the bottom (drawing at right).





BUILDING THE DRAWERS

The five drawers in the tool chest are much smaller than those in the larger tool cabinet. Because these drawers are small, I didn't use false fronts. Here, the drawer fronts are made from oak and the sides and backs of the drawers are made from maple, since only the drawer front is visible when it's closed.

The drawers are shallow so that everything inside is in plain sight when I open a drawer. However, the drawers still need to be as strong as possible. So I used locking rabbets to join the parts.

SIMPLE JOINERY. Since the drawers are built with the same joinery, (only the drawer part sizes are different), it makes sense to cut the joinery for the drawers, as in detail 'a' above, all at once.

Before assembling the drawers, you'll need to cut some grooves. First I cut a groove on the inside face of all the parts. It's sized to hold a 1/4" plywood bottom.

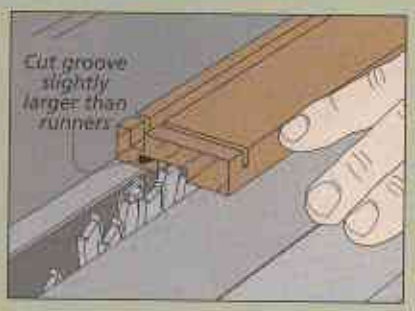
A second and larger groove is cut on the outside of drawer sides. This groove will fit over the drawer runners in the case. I positioned the groove so that there is an even gap at the top and bottom, as in detail 'b.' To do this, I cut a few test pieces so that I could check the setup.

Once the grooves are cut, you can go ahead and cut the drawer bottoms and glue up the drawers. There's just one more thing to do. You'll need to notch out the drawer back so that the drawers will fit over the runners. You can see how I did this in the drawing below.

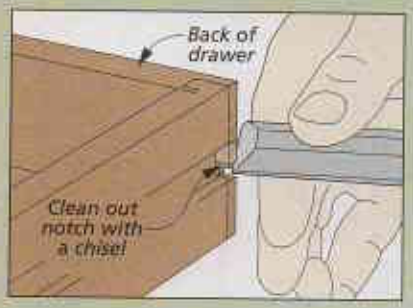
Finally, I added the brass pulls. They're a smaller version of the knobs I used on the tool cabinet. W

How-To: Wood Drawer Guides

Drawer Guides. *The drawers in the tool chest slide on wood runners mounted in the case. The runners fit in grooves cut on the drawer sides. A little wax will make them slide even smoother.*



Groove. *After cutting the joinery for the drawer parts, I cut a groove in the drawer sides. The groove is sized slightly larger than the runner.*



Notch. *To allow the drawer to slide onto the runner, you'll need to cut a notch in the drawer back. I used a hand saw and a chisel to do this.*

putting your Best Face Forward

Discover what makes the difference between a good project and a great one — go with the grain.

Whenever we feature an heirloom project in *Woodsmith*, one of the comments we usually hear is, "That looks great. What kind of wood did you use?" In the case of the tool cabinet on page 32, the short answer to that question is white oak. But that's really only part of the story.

In order to understand how the choice of wood affects the look of a project, you have to go beyond the type (species) of wood and consider other factors like grain appearance, board selection, and even the way the lumber is cut. And this is especially true with oak.

THE GOAL. Because the tool cabinet is going to see some heavy use in the shop, oak seemed like a natural choice. But the only problem with oak is that it can have very pronounced grain patterns that would detract from the clean, simple lines of the design.

The solution was to use only boards having nice, straight grain. But finding boards like this isn't just a matter of luck — it all has to do with the way the boards are cut from the log at the saw mill.

Most logs are flatsawn — so the boards end up with the wavy, "cathedral" grain that is characteristic of oak. But since I didn't want this look for the tool cabinet, I used riftsawn and quartersawn lumber instead. (See *Designer's Notebook* on opposite page for more on this.)

RIFTSAWN. Riftsawn lumber has straight, uniform grain. This is the type of lumber I chose for the major parts of the tool cabinet — the case sides, top, and bottom, as well as the door rails and stiles.

To see the difference that riftsawn lumber makes in the appearance of a project, take a look at the photos at the top of the opposite page. The first photo shows a tool cabinet made entirely out of flatsawn lumber. You can see how the wild grain patterns run in every direction. It almost makes you dizzy just to look at it. And notice how little details like the door panels and the through tenons on the side of the case are almost lost in the shuffle.

By contrast, take a look at the second photo, which shows the same tool cabinet but this time built with riftsawn lumber. The straight, even grain complements the design of the project and leads your eye to the details that you

want to be noticed. The look is a lot more subdued and understated.

Aside from the appearance it makes on the project, using riftsawn lumber has some other benefits. For one, riftsawn lumber is more stable than flatsawn lumber. This really makes a difference when you're dealing with wide, solid-wood panels like the sides, top, and bottom of the case.

The straight grain of riftsawn lumber also makes it a lot easier to hide jointlines when gluing up a panel out of several boards. This can be nearly impossible to do with the wavy grain of flatsawn boards.

QUARTERSAWN. While riftsawn lumber was the perfect choice for the main parts of the tool cabinet, it would start to look a little monotonous if I used it for the entire project. To add a little contrast, I used quartersawn oak for the door panels and drawer fronts. As you can see in the photo on the opposite page, the quartersawn effect of the oak adds just the right amount of accent — the same way that a highly-figured veneer would. The key is to use it sparingly.

BRINGING IT ALL TOGETHER. So how do you incorporate these ideas into the next project you build out of oak? First, try to visualize how the different types of grain appearances will affect the look of your project. You might even want to draw some sketches to help you get an idea. Then after selecting your lumber, carefully lay out your pieces on each board before you actually cut them in order to match color and grain pattern. Finally, label the pieces as you go so you can keep everything organized. It's a little more work, but the results really pay off in the finished project. W

▲ The wild, wavy grain of the flatsawn lumber used to build this project takes away from the clean lines of the design.

▲ The straight, even grain of riftsawn and quartersawn lumber allows the finer points of the design to shine through.

DESIGNER'S NOTEBOOK

It's All In the Grain

What you see at right are three white oak boards that might have come from the same tree but have a very different appearance. It's all in how they were cut from the log.

Most oak you'll come across is flatsawn. These boards are just sliced from the log in order without regard to the orientation of the growth rings. They'll usually have an arch or "cathedral" grain pattern.

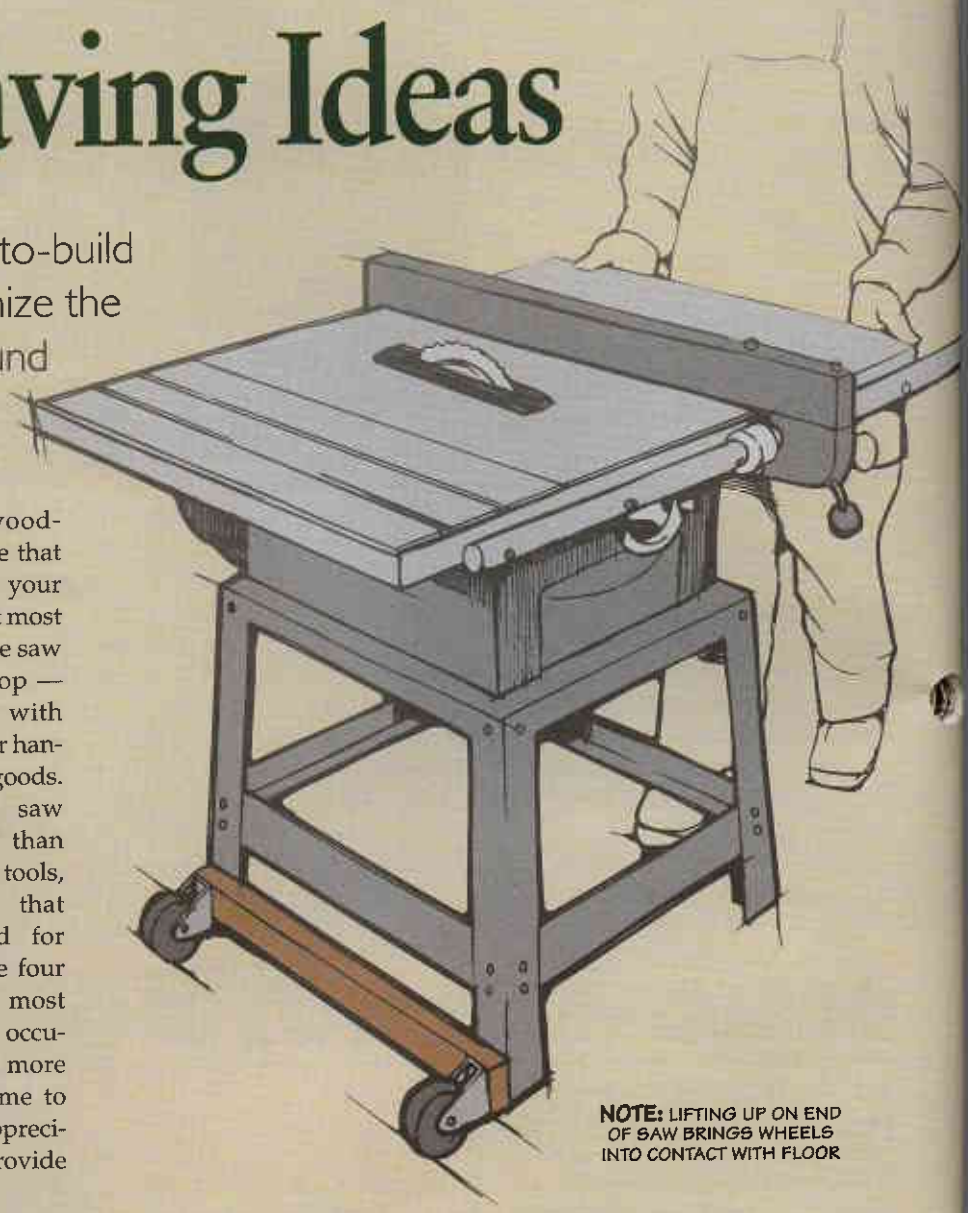
If the saw operator first cuts the log into quarters and then carefully resaws these quarter logs, the lumber produced looks very different. Quartersawn oak is cut so that the annual rings are perpendicular to the face. This produces a straight-grained board with large, crossgrain flakes.

A slight variation on quartersawing is riftsawing. Again the log is first quartered, then boards are cut with the annual rings at 30 to 60 degrees to the face (left board). Riftsawn oak will have a very straight grain without the bold flakes of quartersawn oak.

It's unlikely that you'll find anything but flatsawn oak at your local home center. But a lumber dealer that specializes in hardwoods will probably also carry riftsawn and quartersawn oak, or at least be able to order some for you. W

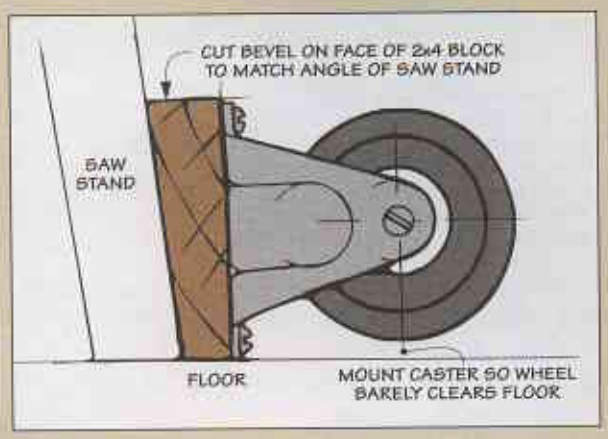
table saw Space-Saving Ideas

Four quick & easy-to-build solutions to maximize the storage space around your table saw.



No matter what kind of woodworking you do, chances are that the table saw is the heart of your shop. So it's only natural that most woodworkers give their table saw the best location in the shop — usually right in the center, with plenty of room on all sides for handling long boards and sheet goods.

Although your table saw may deserve more space than any of your other power tools, there's no reason why that space can't be organized for maximum benefit. Here are four ideas to help you get the most out of the space your saw occupies. None of them takes more than an hour or two of time to build, but you're sure to appreciate the extra space they provide for years to come.



Making It Mobile

It's no secret that table saws eat up a lot of real estate in a shop. But there's an easy way to reclaim at least some of that space — by making your saw mobile. This allows you to roll the saw out of the way when you're not using it.

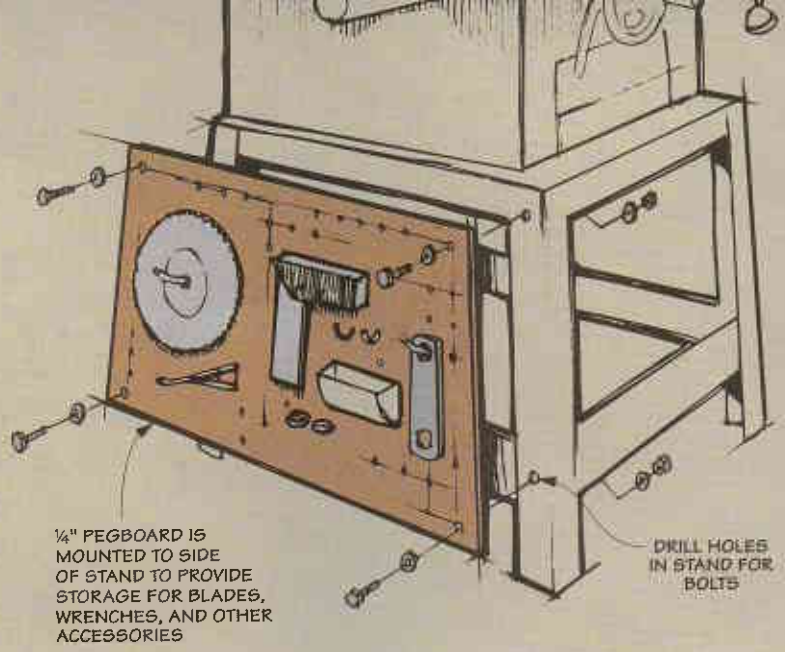
Now there are plenty of aftermarket mobile bases available. But you can get the same results by simply adding a pair of casters to your existing table saw stand.

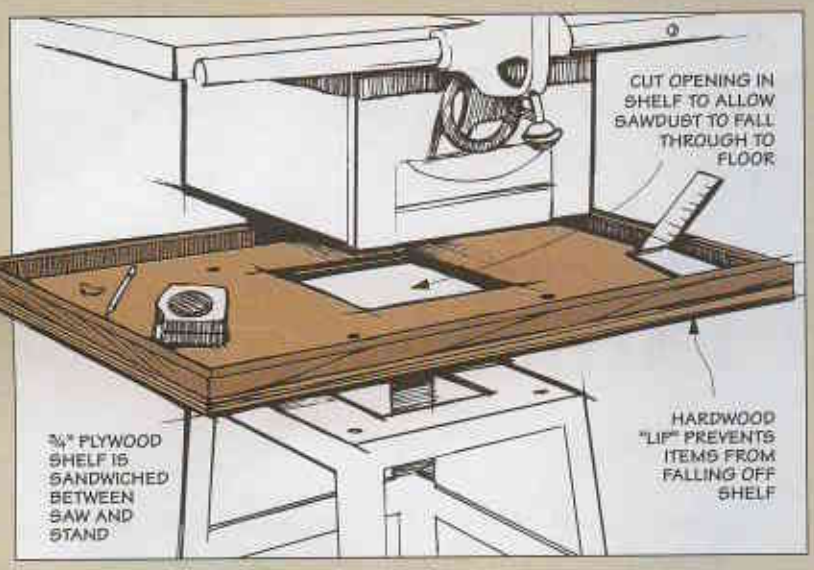
Mount the casters to a block of wood that is bolted to the stand (see drawing above). The trick is to position the casters so they're just above the floor (see drawing at left). Then all you have to do is lift the end of the saw up slightly to bring the casters in contact with the floor so you can roll it around like a wheel barrow. The best part is that when you set the saw back down, it rests solidly on the floor.

Bolt-On Pegboard

It doesn't take long to accumulate a number of accessories for your table saw — things like blades, insert plates, arbor wrenches, etc. Instead of taking up space in a tool cabinet or drawer, you can add a simple storage rack to the side of your table saw stand, just as you see in the drawing at right.

The rack is nothing more than a piece of 1/4" pegboard that is cut to match the profile of the side of your stand. After drilling some holes in the metal stand, you can bolt the pegboard in place and use pegboard hooks to hang up the items that you want to keep close at hand.





Tool Shelf

Whenever I'm working at the table saw, I usually have a number of items that I'm constantly using to lay out and mark my workpieces — a square, tape measure or rule, and a pencil. If you set these items on top of the saw, they can get in the way or accidentally fall off onto the floor from the vibrations of the saw. An easy solution is to add a tool shelf to your saw like the one you see at left.

The shelf is just a piece of 3/4" plywood that is sandwiched in between the saw and the stand. A hardwood lip on all four edges keeps items from falling off. And an opening cut in the center of the shelf allows sawdust to fall through to the floor.

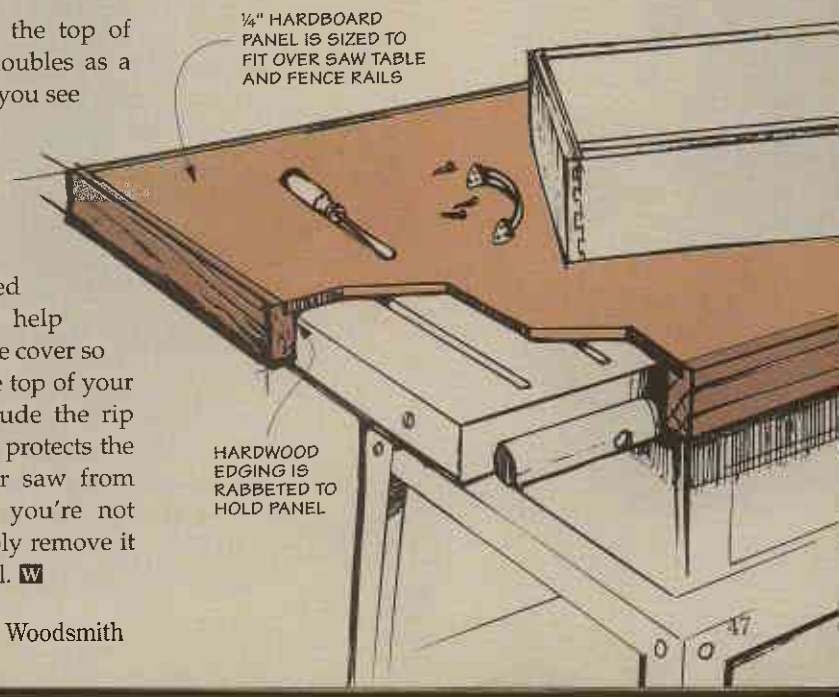
Table Saw Worksurface

In a small shop, worksurfaces are usually in short supply. So it seems only natural for the top of your saw to get pressed into service as an assembly table or finishing area when it's not being used for cutting wood. But there are a couple of drawbacks to doing this.

For one thing, workpieces tend to drop down into the miter gauge slots and the opening in the insert plate when working on top of your saw. But more importantly, you run the risk of scratching or damaging the surface of your table saw by working directly on it.

The solution is a simple one. All you need to do is make a cover that slips over the top of your table saw and doubles as a worksurface, just like you see in the drawing to the right.

The cover is made out of a piece of 1/4" hardboard with some rabbeted hardwood edging to help hold it in place. Size the cover so that it just fits over the top of your saw. (Be sure to include the rip fence rails.) The cover protects the cast iron top of your saw from damage. And when you're not using it, you can simply remove it and hang it on the wall. W



finishing room

5 ways to Revive a Finish

Once a project leaves the shop, I tend to forget about it. But I recently noticed that a few of my older projects weren't looking as good as they did at first. What happened is that over the years, dirt, wax, grease, and grime built up without much notice until the piece looked faded and dull.

I used to think that the only way to "fix" the problem was to strip the piece to bare wood and start over. That's true in some cases, but most of the time you can revive a piece of furniture using one or two of the simple techniques that follow.

1 Simple Cleaning

The first thing I do is clean the piece. It's possible the finish may not be damaged at all and a good cleaning will bring back the shine. For best results, I use a little mineral spirits and a soft rag, as in the photo at left. Mineral spirits are strong enough to lift dirt, grease, and any old wax. (It's best to test first in a hidden area to make sure it won't lift the finish.) Mineral spirits may be labeled as "paint thinner" in the store. Check the label to make sure that it's 100% mineral spirits so that it won't strip the finish.

After scrubbing out the dirt, the project will have a slightly hazy look. Just wipe the surface with a damp rag and it should be brighter and clearer looking.

2 Wax & Buff

The simplest and quickest way to restore the warm glow to wood is to add a coat of furniture wax. And it provides better results and more protection than a bottle of furniture polish. I like to use a tinted wax because it not only protects the finish, but it also hides small scratches.

To apply, wipe on a thin coat with a rag, as in the photo above. Then once the wax starts to haze over, buff it out to a shine.

3 Add a Fresh Topcoat

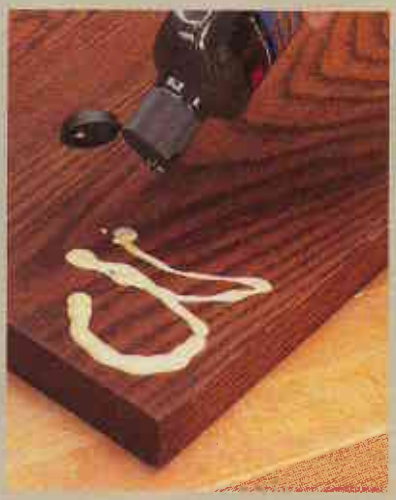
Sometimes it's just as easy to add a fresh top coat to restore a finish. And that's easy with two of my favorite finishes — oil and shellac.

After cleaning the surface, simply apply a fresh coat of oil with a brush or rag. I let the oil soak in for about 10-15 minutes and then wipe off the excess with a dry rag. It's important to wipe off as much of the excess as possible. If you don't, the oil can become sticky and it will be tougher to buff smooth later. The next day, use a soft cloth to rub the surface smooth.

SHELLAC REVIVES QUICKLY. Like oil finishes, you can rejuvenate a shellac finish with another coat. The new shellac softens the previous coats so that it melts into a single, protective layer. (Shop Note: To find out if your project has a shellac finish, see the photo at right.)

Although you can spot-fill dings and scratches in the finish coat with shellac, I find it's just as easy to brush on a new coat over the entire surface. The fresh coat flows across and fills any scratches leaving the surface smooth.

▲ To find out if a project has a shellac finish, wipe a hidden area with a rag dampened with denatured alcohol. If the finish starts to lift off, then it's shellac.



▲ Fine abrasive particles in automotive polish quickly erase small scratches and blemishes.

4 Polish Brings Back the Shine

Another quick way to breathe new life into a finish is with automotive polish. This works best on thick, film finishes on table tops. Here, the finish may be etched or it may have small scratches that don't penetrate the finish to the wood.

Automotive polish contains fine abrasives that wear away the top of the finish leaving a smooth surface. You can find the polish in auto supply stores. Just make sure that you don't pick up rubbing compound (which isn't meant for furniture). The polish comes in a variety of grits. The finer the grit, the glossier the end result. I usually get the finest so that it's less likely I'll cut through the finish.

POLISH THE WHOLE SURFACE. Now you might be tempted to rub out only the hazed or etched area, but that may not be the best thing to do. The freshly polished surface that results will stand out just as much as the scratches. So what I do is rub out the entire surface after taking care of any blemishes.

To use it, squirt the compound on the surface and rub it out lightly with a soft rag. When you're finished, wipe the surface clean.

5 New Life for Varnish & Polyurethane

Varnish and polyurethane are hard, durable finishes that are more resistant to wear and tear. But even these finishes will get scratched after a few years of use.

If the topcoat is thin, or the scratches are too deep to remove with automotive polish, I like to apply a fresh topcoat. However, the process is a little different than for renewing shellac or oil finishes.

Varnish and polyurethane are called "reactive" finishes. This means that each coat dries and cures independent of the layers below it. To revive this type of finish, you'll need to take a couple of extra steps to get the best results.

SCUFF SAND FOR BETTER RESULTS. First of all, you'll want to make sure the surface is clean and dry. The next step is to *lightly* sand the surface of the project. This scuffs the top layer enough so that the next coat has something to grab onto, making it less likely to chip or flake off.

Use a fine sandpaper like 400 or 600 grit for this step. You don't want to sand through to bare wood, just scuff the surface.

TWO-STEP BRUSHING TECHNIQUE. Next, brush on a fairly thick coat of varnish or polyurethane. You'll want to make sure to apply it as evenly as possible. To make it even smoother, after applying the finish, I hold the brush vertically and lightly go over the wet finish with the tip of the brush to remove brush marks and any bubbles. W

▲ Before adding a new coat of polyurethane or varnish, lightly sand the project so that the next coat has something to grab onto.

Questions & Answers

What to consider when locating your bench vise.

Q ***I'm building a workbench for my shop. What's the best place to locate the vise(s)?***

Alison Oslund
St. Louis, Missouri

A While there aren't any hard and fast rules on where to locate a vise on a workbench, there are a few guidelines that can help you out.

The main thing to consider is whether you are left- or right-handed. If you are right-handed, locating the face vise on the left side of the bench will probably work better for you. The reason is that the bench is less likely to get in your way when working and the force of your work, when planing, sawing and sanding will be towards the bench and not away from it. Left-handers will often find the best location is on the right side of the workbench.

Another thing to consider is the type of bench you are using now or have used in the past. You may have developed some tendencies and habits that are suited to having the face vise on one side or the other

The end or tail vise would then be placed on the opposite end of the workbench to keep the vise screws and guide rods from interfering with each other. W

Simple tips for resawing lumber with a table saw.

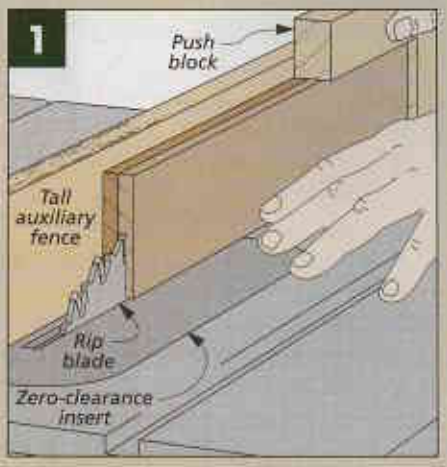
Q ***Is it possible to resaw lumber if I don't have a band saw?***

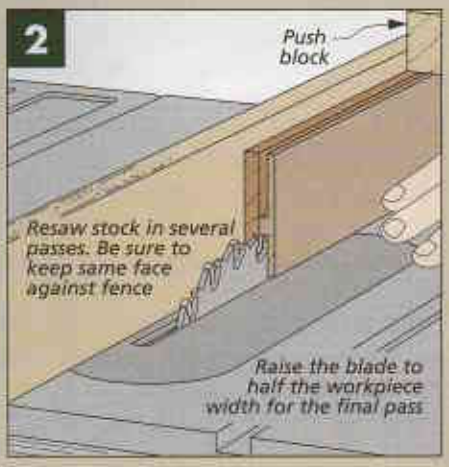
John Seney
Hilo, Hawaii

A When it comes right down to it, resawing is really a ripping operation. So a table saw is perfectly suited for this task.

There are a few things to keep in mind. First, it's a good idea to use a zero-clearance insert around the blade. And speaking of the blade, to get the fastest cut, I like to use a rip blade.

To resaw, set the rip fence to the final thickness plus $\frac{1}{16}$" (for sanding), as in Fig. 1. For pieces that are more than 3" wide, you'll need to cut them in multiple passes. Set the blade height, then make a cut, keeping the workpiece tight against the fence. Now flip the board end for end to make the second cut. Note: Be sure to keep the same face against the fence. Between each set of cuts, raise the blade about $\frac{1}{2}$" until the blade cuts the pieces apart (Fig. 2). W





Do you have any questions for us?

If you have a question related to woodworking techniques, tools, finishing, or hardware, we'd like to hear from you.

Just write down your question and mail it to us: Woodsmith, Q&A, 2200 Grand Avenue, Des Moines, Iowa 50312. Or you can email us the question at: woodsmith@woodsmith.com.

Please include your full name, address, and daytime telephone number.

Sources

TOOL CABINET & CHEST

For such a large project, the tool cabinet doesn't really require much in the way of special hardware. The common items (screws and washers) can be found at any good hardware or home improvement store. I ordered all of the other supplies I needed from *Rockler*.

First, you'll need seven pairs of 18"-long *Accuride* full-extension drawer slides in black (#89690). To install the doors, I purchased a nice pair of 2" bright brass butt hinges (#25767). And a couple of versatile brass ball catches (#28613) will keep the doors closed. Finally, you'll need to purchase some 1¼"-dia. bright brass knobs (#35485) to install on the doors and drawers.

If you decide to put your cabinet on wheels, the 5"-dia. red locking swivel casters (#31845) that I used came from *Rockler*.

To build the small tool chest, I only had to purchase a few screws and some 1"-dia. bright brass knobs (#35477).

LOUVERED SHUTTERS

I only needed to find a couple of hardware items to build the louvered shutters. I ordered a package (100) of 3/32"-dia. x ¾" steel dowel pins (#26716) from the *Fastenal Company* to use for pivot pins. Check their website for the number of a local outlet. The double point staples are commonly found at hardware or home improvement stores.

LOUVERED LAMP

Again, all of the supplies for the louvered lamp came from *Rockler*. I ordered the easy-to-install, white, two-light *Pockit*® light kit (#39668), as shown in the photo below, to provide the illumination.

You'll also need to purchase four, knurled brass knobs (#70003), four threaded brass inserts (#33183), and some metal tabletop fasteners (#34215).

NEW SLOT CUTTERS

The stackable slot cutter (#61-102) that I tried out is made by *Freud*. You can check their website or call the number listed for dealer information. Several other manufacturers make similar sets.

I purchased the *Amana E-Z Dial* (#55510) adjustable slot cutter from the *Woodsmith Store*. Their number is listed as well as that for *Amana Tools*.

DADO CLEAN-OUT BITS

The ½" dado clean-out bit (#5382) that I made good use of on the tool cabinet, came from *MLCS*. Give them a call for more infomation.

KELLER JIGS

The 1500 model *Keller* jig that I like to use is the smallest in the *Keller* lineup. I find that this small jig is adequate for all my shop needs, but several larger models are also available. You can find one at the *Woodsmith Store* or check the other sources listed.

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MAIL ORDER SOURCES

Similar project supplies may be ordered from the following companies:

Rockler
800-279-4441
rockler.com
Brass Ball Catches, Brass Knobs, Drawer Slides, Hinges, Keller Dovetail Jigs, Knurled Brass Knobs, Pockit Light Kits, Swivel Casters, Tabletop Fasteners, Threaded Brass Inserts

Woodsmith Store
800-835-5084
Amana Router Bits, Brass Knobs, Drawer Slides, Freud Router Bits, Keller Dovetail Jigs, Rockler Hardware

Amana Tool
800-445-0077
amanatool.com
E-Z Dial Slot Cutting Router Bit

Fastenal Company
fastenal.com
Steel Dowel Pins

Freud Tool
800-334-4107
freudtools.com
Router Bits

McMaster-Carr
630-833-0300
mcmaster.com
Steel Dowel Pins

MLCS
800-533-9298
mlcswoodworking .com
Router Bits

Keller & Co.
800-995-2456
kellerdovetail.com
Dovetail Jigs

Woodworker's Supply
800-645-9292
woodworker.com
Brass Knobs, Drawer Slides, Keller Dovetail Jigs, Tabletop Fasteners, Router Bits

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looking inside

Final Details

▲ *Louvered Lamp.* This great-looking accent lamp uses louvered shutters to control the brightness and direction of the light. The lamp instructions begin on *page 20*. The article on louvered shutters starts on *page 16*.

▲ *Tool Cabinet.* Of course, a tool cabinet needs to be solidly built and have tons of storage space. But this heirloom cabinet looks great too. It's built from oak and features a unique joinery technique. There's even an option to make it mobile. Detailed plans begin on *page 32*.

► *Nantucket Bench.* Six parts — that's all there is to this handsome bench. We'll show you a clever technique for cutting through mortises on the table saw. You can even choose your finish — natural or painted. The plans start on *page 26*.